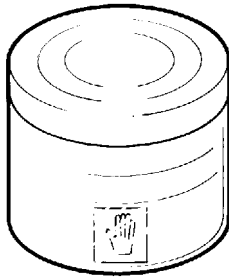


Contents	Page No.
Service Tools	1 - 1
Slide Hammer Kit Procedure	1 - 4
Rivet Nut Tool Procedure	1 - 5
Technical Data	
Air Conditioning (Option)	2 - 1
Basic Operation	
Air Conditioning	
- R-134a Refrigerant	3 - 1
- System Operation	3 - 1
- System Control	3 - 3
- Safety Procedures	3 - 4
Fault Finding	
Air Conditioning	
- General Fault Indications	10 - 1
- System Diagnosis	10 - 3
- Wiring Continuity Checks	10 - 8
Service Procedures	
Air Conditioning	
- Leak Testing	20 - 1
- Tightening Leaking Hoses	20 - 1
- Checking Refrigerant Charge Level	20 - 1
- Refrigerant Charging and Discharging	20 - 2
- Binary Pressure Switch Testing	20 - 7
- Condenser Matrix Cleaning	20 - 8
- Filters - Changing and Cleaning	20 - 9
- Compressor Drive Belt - Adjusting	20 - 10
Glazing	
- Removing Broken Glass and Old Sealant	21 - 1
- Preparing and Installing New Glass	21 - 4
Cab ROPS/FOPS Structure - Checks	22 - 1
Engine Panels - Removing and Fitting	23 - 1
Stabiliser Leg - Wear Pad Adjustment	24 - 1
Extending Dipper - Wear Pad Adjustment	25 - 1
Sideshift - Hydraclamp Clearance Setting	26 - 1
Power Sideshift	
- Wear Pad Renewal	26 - 2
- Chain Adjustment	26 - 3
Air Conditioning	
HVAC*/Air Conditioning Unit	
- Removal and Replacement	30 - 1
Blower Unit - Removal and Replacement	30 - 3
Freeze Protection Thermostat	
- Removal and Replacement	30 - 3
Evaporator Matrix - Removal and Replacement	30 - 3
Binary Pressure Switch	
- Removal and Replacement	30 - 5

*HVAC = Heating, Ventilation and Air Conditioning

Contents	Page No.
Loader Arms - Removal and Replacement	35 - 1
Stabiliser Legs - Removal and Replacement	36 - 1
Kingpost - Removal and Replacement	37 - 1
Boom & Dipper - Removal and Replacement	38 - 1
Hydraulic Tank - Removal and Replacement	39 - 1
Power Sideshift Ram Removal and Replacement	40 - 1
* Cab Panels - Removal and Replacement	
Side Console	50 - 1
Front/Steering Console	51 - 1



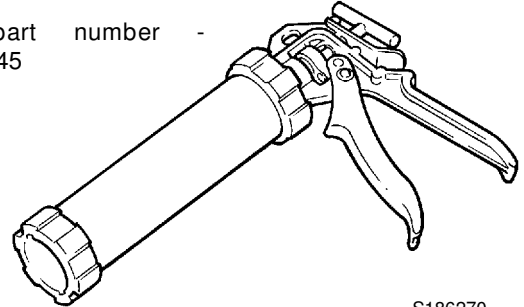
Hand Cleaner - special blend for the removal of polyurethane adhesives.

JCB part number - 4104/1310
(454g; 1 lb tub)

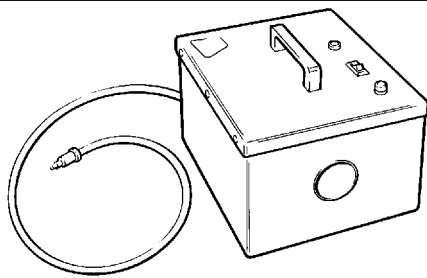
S186240

Cartridge Gun - hand operated - essential for the application of sealants, polyurethane materials etc.

JCB part number -
892/00845



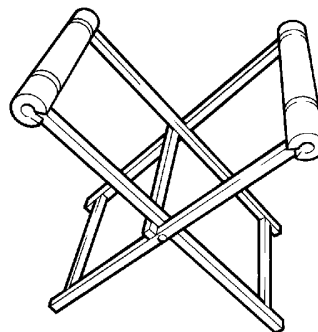
S186270



12V Mobile Oven - 1 cartridge capacity - required to pre-heat adhesive prior to use. It is fitted with a male plug (703/23201) which fits into a female socket (715/04300).

JCB part number - 992/12300

S186250



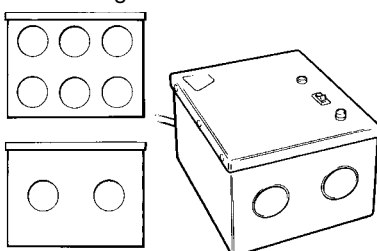
Folding Stand for Holding Glass - essential for preparing new glass prior to installation.

JCB part number -
892/00843

S186280

240V Static Oven - available with 2 or 6 cartridge capacity - required to pre-heat adhesive prior to use. No plug supplied. Note: 110V models available upon request - contact JCB Technical Service.

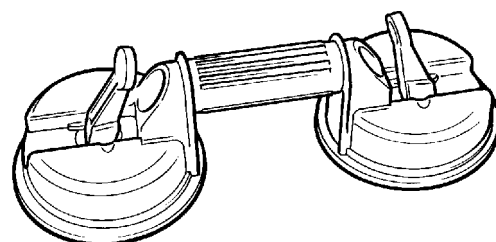
JCB part number:
992/12400 - 2 Cartridge x 240V
992/12600 - 6 Cartridge x 240V



S186260

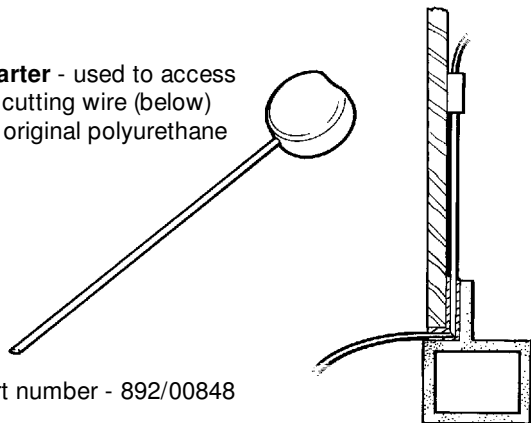
Glass Lifter - minimum 2 off - essential for glass installation, 2 required to handle large panes of glass. Ensure suction cups are protected from damage during storage.

JCB part number - 892/00842



S186300

Wire Starter - used to access braided cutting wire (below) through original polyurethane seal.

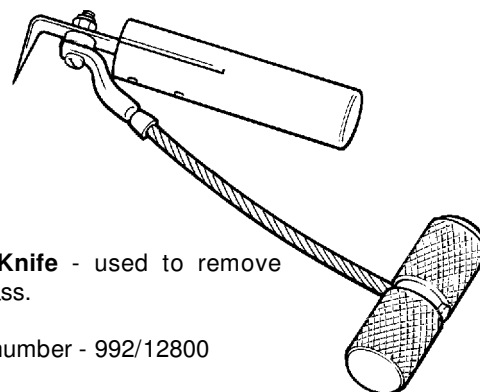


JCB part number - 892/00848

S186310

Cut-Out Knife - used to remove broken glass.

JCB part number - 992/12800

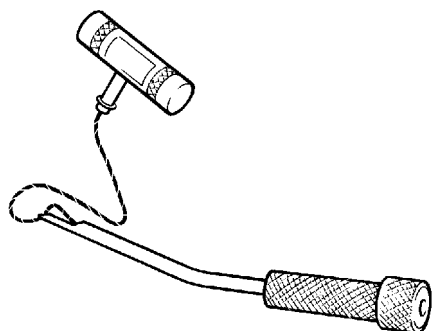


S186340

Glass Extractor (Handles) - used with braided cutting wire (below) to cut out broken glass.

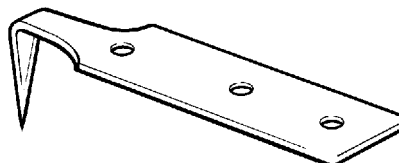
JCB part number - 892/00846

S186320



'L' Blades - 25 mm (1 in) cut - replacement blades for cut-out knife (above).

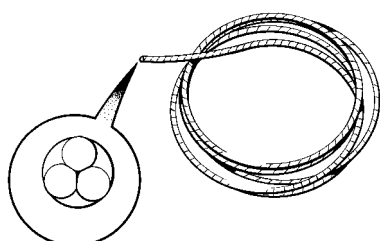
JCB part number - 992/12801 (unit quantity = 5 off)



S186350

Braided Cutting Wire - consumable heavy duty cut-out wire used with the glass extraction tool (above).

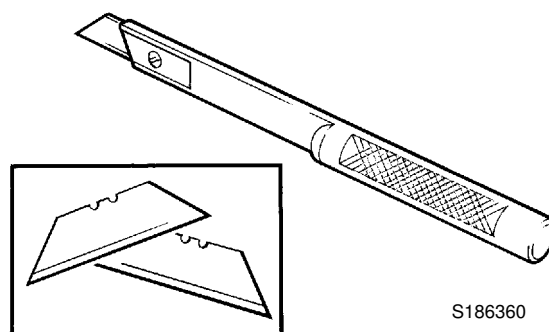
JCB part number - 892/00849
(approx 25 m length)



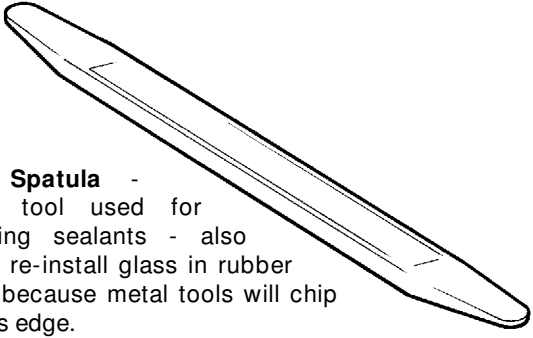
S186330

Long Knife - used to give extended reach for normally inaccessible areas.

JCB part number - 892/00844



S186360



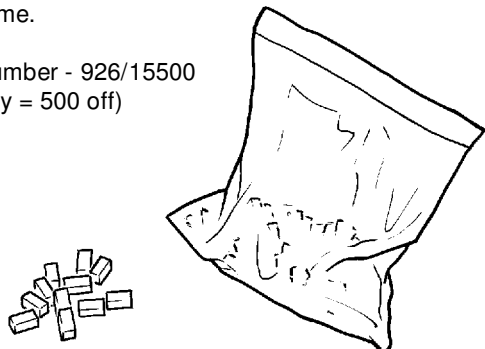
Nylon Spatula -
general tool used for
smoothing sealants - also
used to re-install glass in rubber
glazing because metal tools will chip
the glass edge.

JCB part number - 892/00847

S186470

Rubber Spacer Blocks - used to provide the correct
set clearance between glass edge
and cab frame.

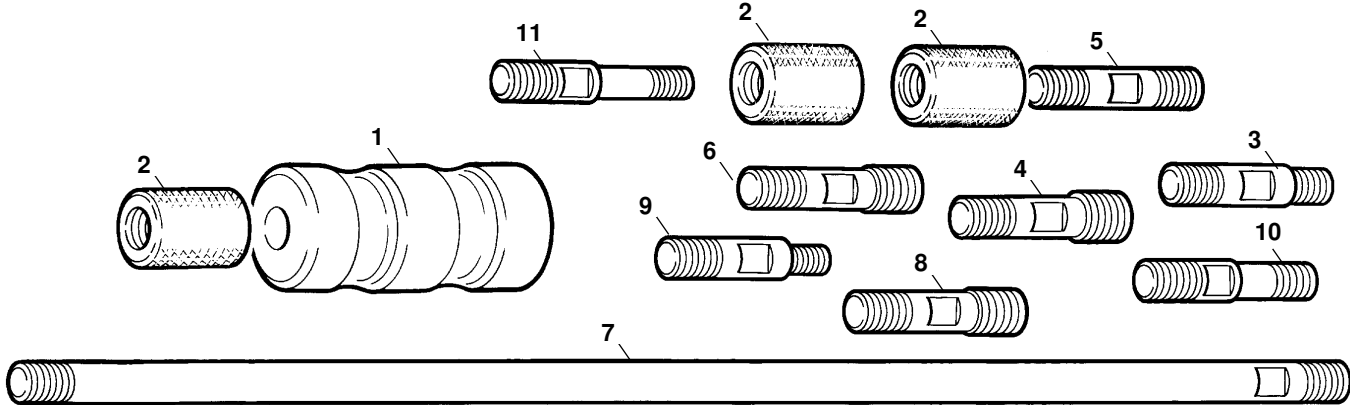
JCB part number - 926/15500
(unit quantity = 500 off)



S186550

Slide Hammer Kit - 993/68100

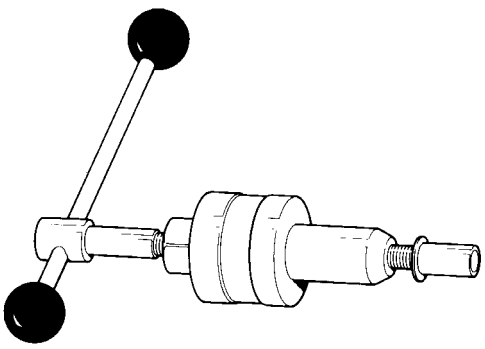
1	:993/68101	Slide Hammer	6	:993/68106	Adaptor - M20 x M24
2	:993/68102	End Stops	7	:993/68107	Bar - M20 x M20 X 800MM
3	:993/68103	Adaptor - M20 x 5/8" UNF	8	:993/68108	Adaptor - M20 x 7/8" UNF
4	:993/68104	Adaptor - M20 x 1" UNF	9	:993/68109	Adaptor - M20 x M12
5	:993/68105	Adaptor - M20 x M20	10	:993/68110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



S196910

826/01099	M6 x 16mm Rivet Nut
826/01101	M6 x 19mm Rivet Nut
826/01103	M8 x 18mm Rivet Nut
826/01102	M8 x 21mm Rivet Nut
826/01104	M10 x 23mm Rivet Nut
826/01105	M10 x 26mm Rivet Nut

Installation Tool Available from:
Bollhoff Fastenings Ltd.
Midacre
The Willenhall Estate
Rose Hill
Willenhall
West Midlands, WV13 2JW



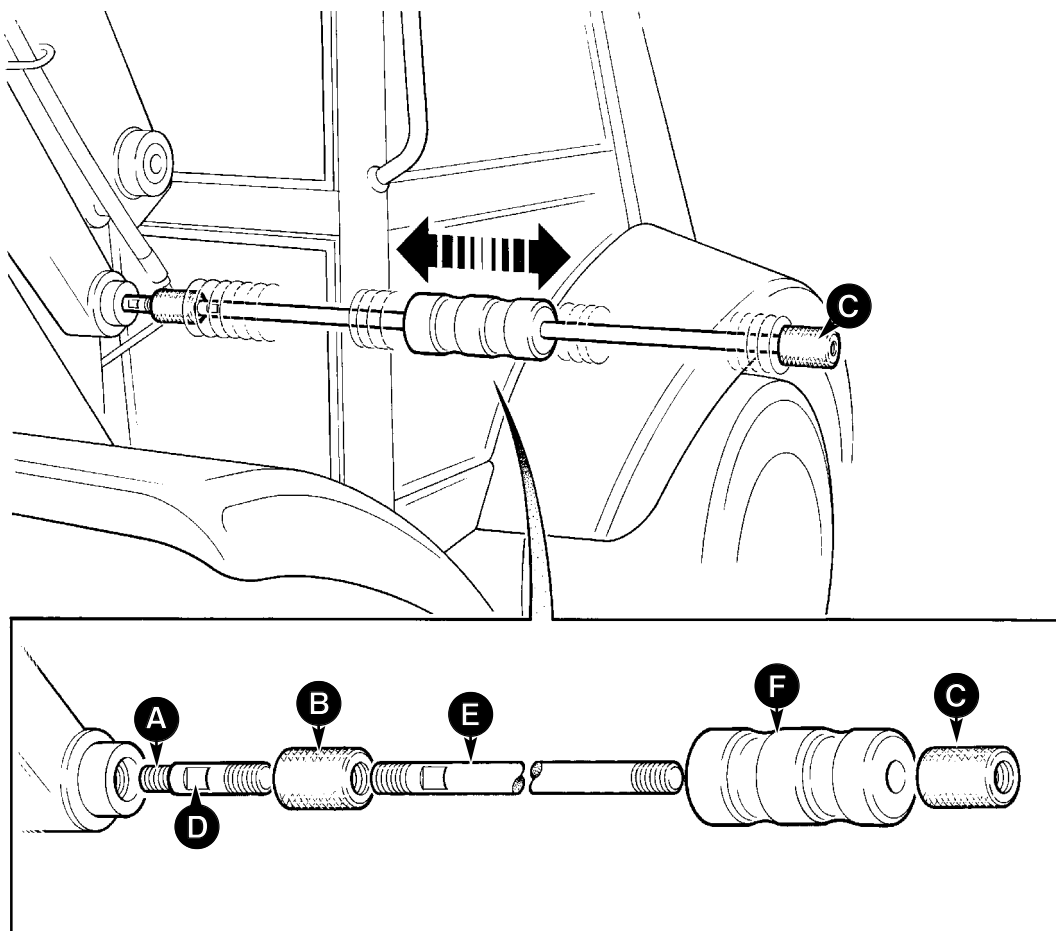
S261210

Slide Hammer Kit Procedure

The slide hammer kit is used to remove pivot pins that must be extracted, i.e. cannot be 'knocked through'. The purpose of this description is to explain how the kit and the various components are used to remove the pivot pins.

The adaptors **A** that form part of the kit have a screwed thread at each end. One of the threads will always be M20 size, this is to accommodate the end stops, items **B** and **C**. The other end of the adaptor will have varying thread sizes to suit the different size of threads in the pivot pins.

- 1 Prepare the pivot pin, for instance, if fitted, remove the pivot pin retaining bolt.
- 2 Determine the thread size of the pivot pin and then fit the appropriate adaptor **A** as shown. Use the spanner flats **D** to securely fit the adaptor.
- 3 Fit an end stop **B** onto the other end of the adaptor (M20 thread size), make sure that the adaptor threads are fully engaged.
- 4 Fit the 'slide bar' **E** into the end stop. Again make sure that the threads are fully engaged.
- 5 Fit the 'slide hammer', item **F**, onto the slide bar as shown.
- 6 Finally, fit another end stop, item **C**, at the end of the slide bar, as shown. The slide hammer kit is now ready to use.
- 7 To extract the pivot pin, slide the hammer along the bar until it contacts end stop **C**. Repeat this step until the pivot pin is released.
- 8 To remove the slide hammer kit, reverse the steps described above.



S196900

Rivet Nut Tool Procedure

A 'Rivet Nut' is a one piece fastener installed 'blind' from one side of the machine body/framework. The rivet nut is compressed so that a section of its shank forms an 'upset' against the machine body/framework, leaving a durable thread (see illustrations).

Rivet nuts are fitted to various parts of the machine body and framework. They are used in a number of applications, for instance, hose clamp and hydraulic valve retention etc.

Various sized rivet nuts are available, see the table below to determine the size of rivet nut to be used for particular applications.

If for any reason a new rivet nut requires fitting, then the correct installation procedure must be followed:

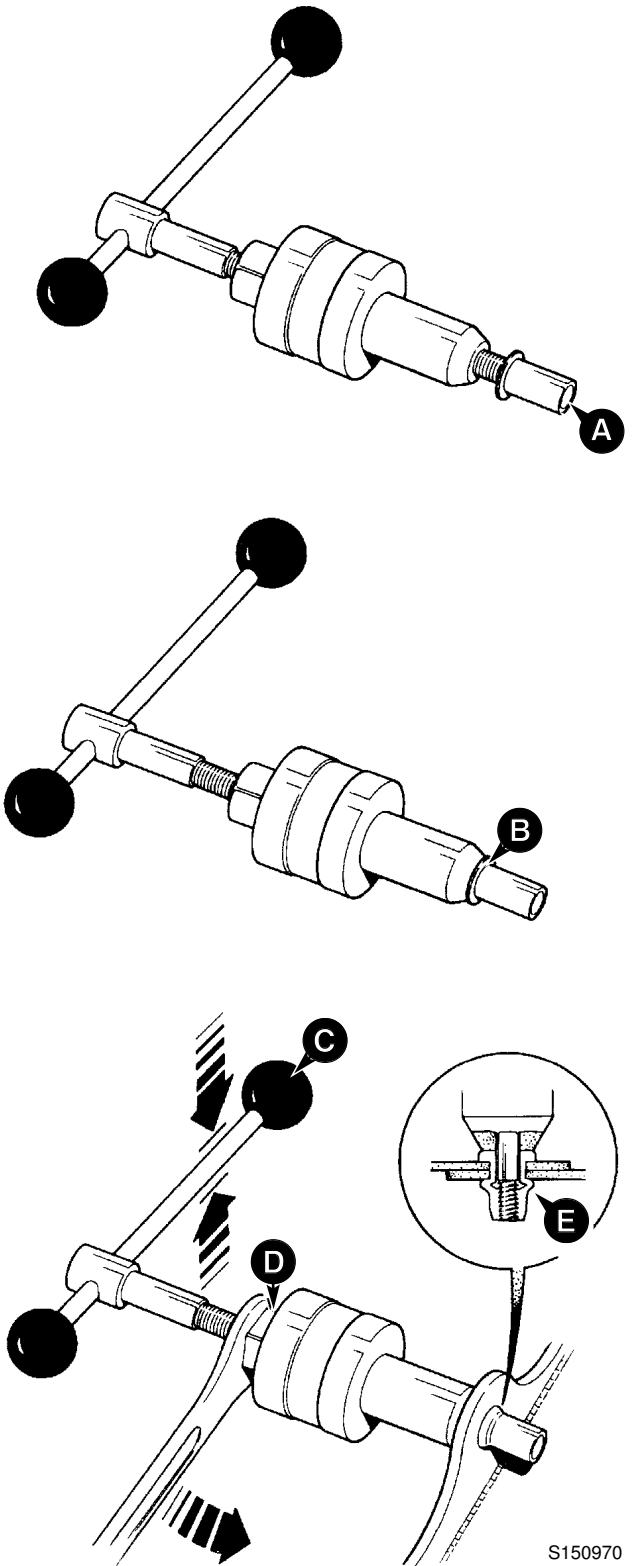
- 1 Drill a hole in the machine body/framework where the rivet nut is to be fitted. De-burr hole edges.
- 2 Screw the rivet nut onto the mandrel of the installation tool. The bottom of the mandrel should be in line with the bottom of the rivet nut, shown at **A**.
- 3 Wind the body of the installation tool down the threaded mandrel until it touches the head of the rivet nut, shown at **B**.
- 4 Insert the rivet nut (assembled to the tool) into the hole drilled in step 1.
- 5 Hold handle **C** and at the same time draw the mandrel into the installation tool by turning nut **D**. The rivet nut will contract in length and form an 'upset' (smooth bulge) seating itself against the body/framework (see inset **E**).

Note: The thread of the rivet nut must not be stripped, take care when 'upsetting' the rivet nut.

- 6 Remove the installation tool.

Specifications (all dimensions in mm)

Rivet Nut Thread Diameter	Rivet Nut Outside Diameter	Material Thickness	Rivet Length (Total)	Drill Hole Dia.
M5	7	0.25 - 3.00	14.00	7.10
		3.00 - 5.50	17.00	
M6	9	0.50 - 3.00	16.00	9.10
		3.00 - 5.50	19.00	
M8	11	0.50 - 3.00	18.00	11.10
		3.00 - 5.50	21.00	
M10	13	1.00 - 3.50	23.00	13.10
		3.50 - 6.00	26.00	



S150970

Note: In an emergency, and if no installation tool is available, it is possible to fit a rivet nut by using a nut and bolt the same thread diameter as the rivet nut being installed. However, this is not the recommended method.

Air Conditioning (Option)

Binary Pressure Switch Settings

Low Pressure	1.96 bar	(2.0 kgf/cm ²)	28.4 lbf/in ²)
High Pressure	27.5 bar	(28 kgf/cm ²)	400 lbf/in ²)

Thermostatic Switch Settings

Cut out	-0.6 °C	(33.0 °F)
Cut in	4.2 °C	(39.5 °F)

Refrigerant

R-134a	1.4 Kg Maximum charge
--------	-----------------------

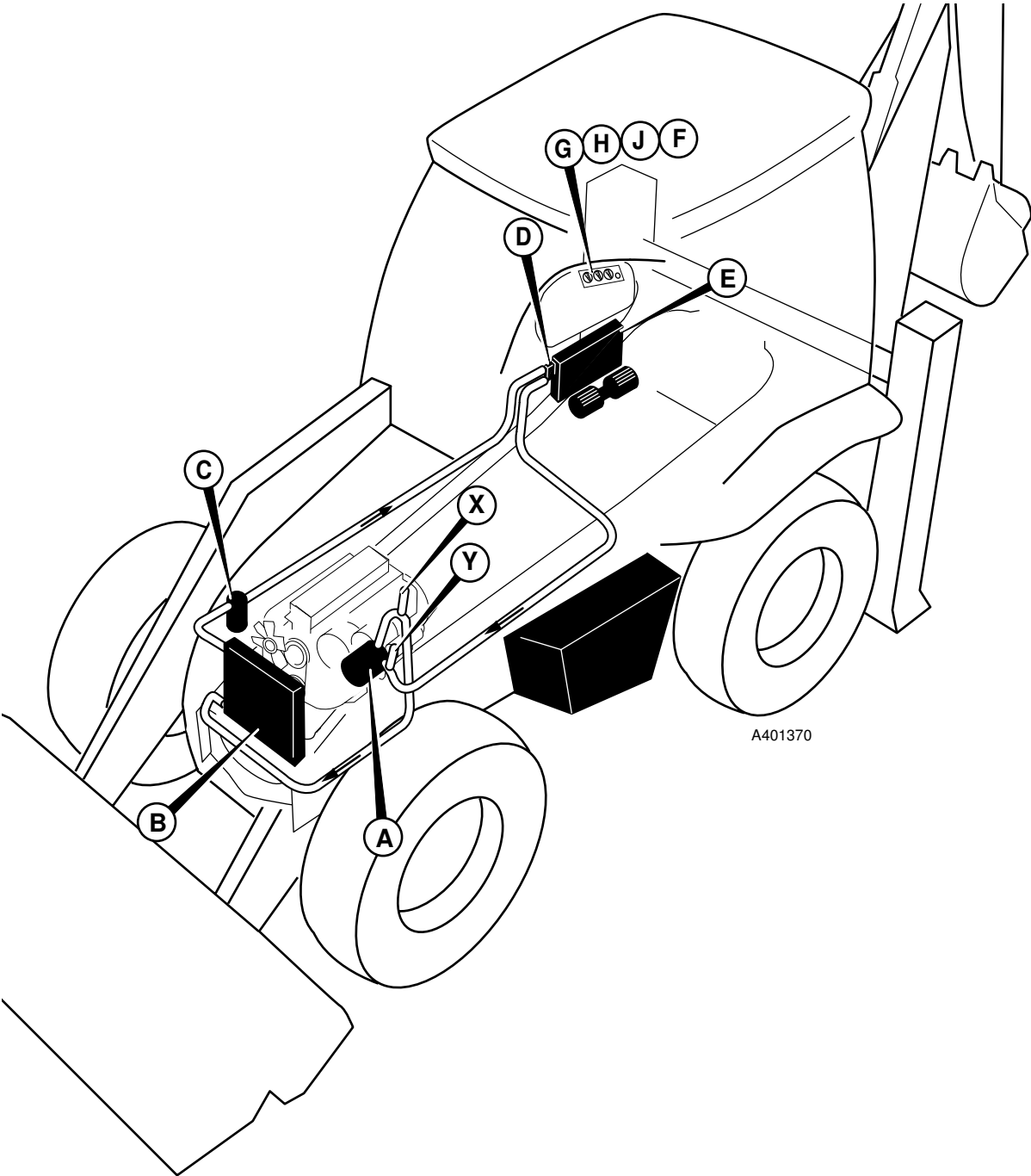
Oil

PAG Oil

Quantities:

Condenser	1.5 fluid oz. (42.6 ml)
Evaporator	3.0 fluid oz. (85.2 ml)
Receiver Drier	0.3 fluid oz. (8.5 ml)
Compressor	None - pre charged
Hoses	If more than 4 metres of hose is replaced, then add 0.5 fluid oz. (15 ml) for every metre over 4 metres.

cardiagn.com



cardiagn.com

Air Conditioning

R-134a Refrigerant

Due to environmental concerns, the use of ozone depleting chlorofluorocarbons (CFCs) in air conditioning systems is being gradually phased out.

The R-12 refrigerant used in some systems contains CFCs and is now being replaced by a hydrofluorocarbon (HFC) refrigerant R-134a, which does not cause ozone depletion. **The refrigerant used in the 3CX air conditioning system is R-134a.**

Air conditioning systems using R-134a refrigerant are not compatible with systems using R-12 refrigerant. No attempt should be made to charge R-134a systems with R-12 refrigerant.

System Operation

To maintain optimum operator comfort in warm climates or during seasons of high ambient temperature, the air conditioning system delivers cool, dehumidified air into the cab. Cooling is provided by passing the warm ambient air, together with recirculated air, over an evaporator matrix in the air conditioning unit.

The air conditioning system is a closed circuit through which the refrigerant is circulated, its state changing from gas to liquid and back to gas again, as it is forced through the system.

The major components of the system are the compressor **A**, condenser matrix **B**, receiver drier **C**, expansion valve **D** and evaporator matrix **E**.

To operate the air conditioning, press switch **F** to switch the system on. Press switch **G** to operate the 3-speed heater fan. Rotate **H** to select the desired temperature. Control **J** enables the operator to select either recirculating air or fresh air from outside the machine. A combination of both is also obtainable.

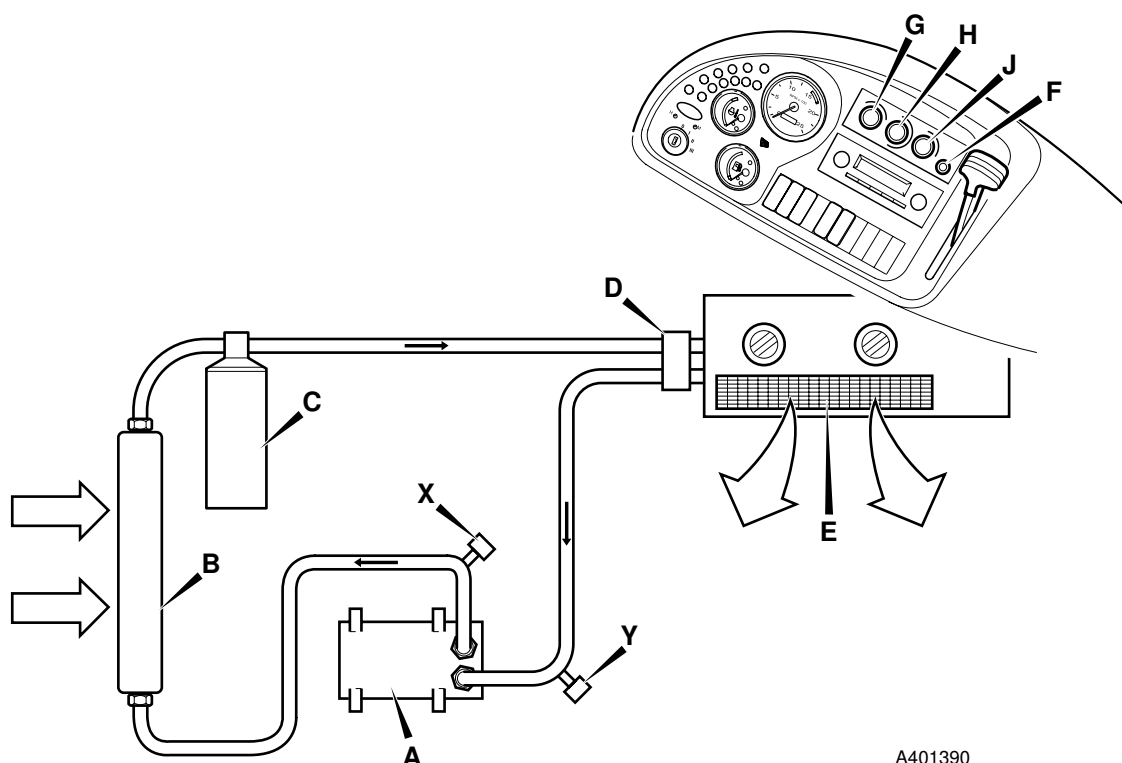
Air conditioning system power is generated from the engine, via an electromagnetic clutch to the compressor. Three switches, connected in series, are included in the clutch supply line, all must be closed for the clutch and therefore the air conditioning system to operate.

The compressor **A** draws in low pressure refrigerant gas from the suction line (evaporator to compressor) and increases refrigerant pressure through compression. This process also increases the refrigerant temperature.

High pressure refrigerant is forced from the compressor to the condenser **B**, which is mounted at the front of the engine. Ambient air is drawn across the condenser by the engine- driven cooling fan. In the condenser, the refrigerant changes state to a high pressure, high temperature liquid but with a lower heat content.

The refrigerant passes through the receiver drier **C**, which contains a desiccant to remove moisture from the system. The receiver drier serves as a reservoir for refrigerant and also includes a filter to remove foreign particles from the system.

The high temperature, high pressure refrigerant is forced by compressor action into the expansion valve **D**, which meters the amount of refrigerant entering the evaporator. In the expansion valve the refrigerant instantaneously expands to become a low pressure, low temperature liquid.



A401390

Air Conditioning

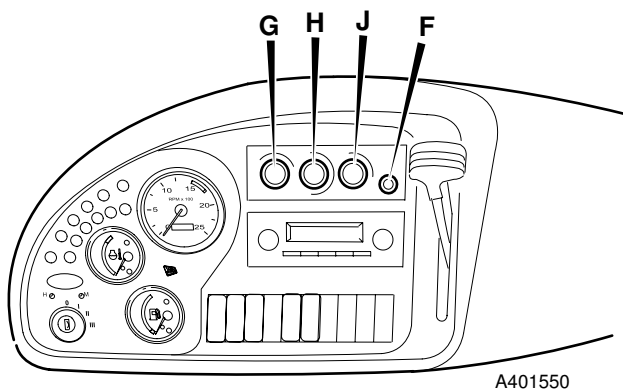
System Operation (cont'd)

The refrigerant is drawn through the evaporator matrix **E** by the suction of the compressor. The temperature of refrigerant is now considerably below that of the air being drawn across the evaporator matrix by the blowers. Heat is transferred from the ambient and recirculated air to the refrigerant, causing the low pressure liquid to vaporise and become a low pressure gas. Moisture in the air condenses on the evaporator matrix and is drained away via condensate.

Cool de-humidified air is emitted through air vents into the cab.

The low temperature, low pressure, high heat content refrigerant gas, is now drawn by suction back to the compressor, where the cycle is completed.

Service connection points **X** and **Y** adjacent to the compressor are provided for connecting the pressure gauge manifold, when charging/testing the refrigerant. Connection **X** high pressure (red) and connection **Y** low pressure (blue).



A401550

System Control

Control of the system is achieved by the cyclic action of the compressor's electromagnetic clutch. When current is fed to the field coil of the compressor's clutch, a magnetic field develops between the field coil and the armature which pulls the field coil, complete with clutch assembly, onto the compressor's rotor. Since the clutch assembly is turned constantly by the crankshaft pulley drive belt, the compressor armature turns, starting the refrigeration cycle.

Current is fed to the field coil through three series switches whose contacts are controlled by the following:

- a The manual A/C ON/OFF switch **F** in the control console.
- b The freeze protection thermostat switch monitoring the evaporator temperature.
- c The high and low level binary pressure switch.

The ON/OFF switch **F** will start the refrigeration cycle provided that the ambient temperature in the cab is greater than 0°C and the refrigerant pressure remains within the specified limits.

The thermostat has its sensor inserted in the evaporator matrix. It controls the refrigeration cycle by switching the compressor clutch on and off to prevent freezing of the condensate on the evaporator matrix.

The high and low level binary pressure switch assembly is located adjacent to the expansion valve on the HVAC unit. If the refrigerant pressure exceeds the upper pressure limit specified or falls below the lower limit, the contacts will open and the clutch will disengage, closing down the refrigeration cycle.

Note: Switch settings are given in the technical data, refer to **Technical Data - Air Conditioning (Option)**.

- F** A/C ON/OFF Switch
- G** Turn to switch on the 3-speed heater fan. Turn further clockwise for faster speeds. It functions only with the starter switch ON.
- H** Temperature - Turn anti-clockwise to increase the heat.
- J** Air Recirculation - Turn clockwise to recirculate air in the cab. Turn anti-clockwise for fresh air from outside. The control can be adjusted to give a combination of recirculated air and fresh air.

Safety Procedures

The air conditioning system includes a pressurised closed circuit containing a non-CFC, environmentally friendly refrigerant, Type R-134a. Any service procedure which breaks into the closed circuit and therefore requires discharging of the system, must only be carried out by service personnel with specialist knowledge of air conditioning systems. The following guidelines should be adhered to by all personnel servicing the air conditioning system.

WARNING

The air conditioning system is a closed loop system and contains pressurised refrigerant. No part of the system should be disconnected until the system has been discharged by a refrigeration engineer. or a suitable trained person You can be severely frostbitten or injured by escaping refrigerant

4-3-4-1/2

CAUTION

Do not operate the air conditioning system when there is no refrigerant in the system, otherwise the compressor will be damaged.

4-3-4-4

- 1 It is critical that the correct refrigerant (R-134a) is used and that charging is done only by qualified personnel. It is illegal to discharge the refrigerant into the atmosphere but as a precaution in case of accidental leakage, discharging and charging of the vehicle refrigerant system must be conducted in a well ventilated area.
- 2 Containers of refrigerant should be stored in a cool environment away from direct sunlight.

WARNING

Do not carry out welding operations close to the air conditioning refrigerant circuit. A poisonous gas is produced when refrigerant comes into contact with naked flames. Do not smoke or allow naked flames close to the refrigerant circuit.

BF 1- 9

- 3 **Do Not** perform welding operations close to refrigerant hoses (maintain a distance of at least 0.5m from hoses).
- 4 **Do Not** steam clean refrigerant system components.
- 5 When charging or discharging the refrigerant system, no smoking or naked flames should be allowed in the immediate vicinity. The refrigerant does not give off a poisonous odour, however, when it comes into contact with a naked flame, a poisonous gas is produced.
- 6 When handling refrigerant, rubber gloves and goggles should be worn. Operators should ensure no refrigerant comes into contact with the skin. Particular care should be taken when connecting or disconnecting charging hoses or pressure switches. When these components are connected to the system, a short release of refrigerant occurs. This results in a high velocity, very cold gas being emitted from the connection point.

- 7 When checking the state of the refrigerant at the receiver drier sight glass, it is necessary to run the engine with the side panel removed and the bonnet raised. Extreme care must be taken to avoid moving engine parts such as fans, pulleys and belts.
- 8 Use caution when working near exposed evaporator fins. Painful cuts can be inflicted by the edges of the fins. Also, damage to the fins will reduce the efficiency of the system.
- 9 Make sure pressure cylinders are not over filled, particularly when recovering refrigerant.
- 10 Disconnect battery before doing any work.

Air Conditioning

The system will not function in very low ambient temperatures, therefore tests should be carried out in a warm environment.

It is recommended that, to locate faults on the system accurately and quickly, an electronic leak detector and a refrigerant pressure gauge should be used. However, leaks can be detected on the system by using soapy water applied to the suspected leak area and system pressure can be assessed by the state of refrigerant passing through the receiver drier sight glass. Following sections of the manual deal with the major components of the air conditioning systems and give further fault finding and maintenance information.

General Fault Indications

There are several indications that may help to determine the fault area on a system not working efficiently:

- | | | |
|---|--|--|
| a) Poor performance. | Low system pressure -
Condenser matrix air flow restricted -

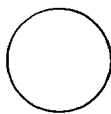
Air filter blocked -
Compressor drive belt too slack - | Evacuate and recharge system.
Remove debris from around matrix using compressed air or low pressure water.
Remove and replace.
Adjust to correct tension. |
| b) Warm or slightly cool air emitted from unit. | Expansion valve stuck open or closed - | Renew expansion valve. |
| c) Blower operates on fan speed 3 only.
Blower does not operate. | Blower resistor failed -
Blower motor failed -
Fuse blown - | Renew resistor.
Renew complete blower unit.
Replace fuse and retest. |
| d) Compressor clutch continually cuts out. | Condenser matrix blockage -

Overcharging of refrigerant system -
Blocked expansion valve/condenser - | Remove debris from around matrix/renew condenser.

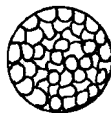
Evacuate and recharge system.
Clear blocked component . |

Sight Glass Indications

An approximate indication of the condition of the refrigerant can be seen through the receiver/drier sight glass when the compressor is running. Refer also to **Service Procedures - Checking Refrigerant Charge Level**.



Clear - No fault indicated unless the system is unable to provide cool air. The indication then is that the system is completely discharged of refrigerant.



Foam or bubbles - Refrigerant low and in need of charging.



Clouded - Dessicant breakdown in the receiver-drier.

S201520

Note: Sight glass indications cannot always give a positive identification of a problem. Further diagnosis, preferably by a refrigeration engineer using pressure gauges, is advisable before reaching a definite conclusion.

Air Conditioning (cont'd)**No Air Conditioning**

CHECK	ACTION
1 Are the controls set correctly, i.e. air conditioning selected, thermostat switch set to coldest position and blower switched on?	YES: Check 2 NO: Reset controls and retest.
2 Is the air conditioning (evaporator) blower working?	YES: Check 3. NO: Check 4.
3 Is the compressor running (visual check of pulley/clutch)?	YES: Check 9. NO: Check 5.
4 Is the air conditioning fuse(s) blown?	YES: Renew fuse(s) and retest. NO: Check 8.
5 Is there a 12V supply to the pressure switch harness? Refer to Service Procedures - Pressure Switch Testing	YES: Check 6. NO: Check 7.
6 Does the compressor clutch engage with pressure switch assembly bypassed? Refer to Service Procedures - Pressure Switch Testing	YES: Replace pressure switch assembly. NO: Renew the compressor clutch and retest.
7 Does the clutch engage with thermostat switch bypassed?	YES: Renew thermostat switch and retest. NO: Check all electrical connections.
8 Are blower switch and wiring OK?	YES: Renew blower unit complete. NO: Renew switch or wiring.
9 Is sight glass indication OK?	YES: Check 10. NO: Charge check required by refrigeration engineer or suitably trained person.
10 Is condensor air flow blocked?	YES: Clean condensor and radiator. NO: Check 11.
11 Is evaporator air flow blocked?	YES: Clean filter and, if necessary the evaporator. NO: Call in refrigeration engineer or suitably trained person.

Air Conditioning - System Diagnosis

This section gives an overview of the following conditions:

Normally Functioning A/C System
 Low R-134a Charge
 Poor Refrigerant Circulation
 No Refrigerant Circulation
 Insufficient Cooling of Condenser
 Air in System
 Expansion Valve Improperly Mounted
 Compressor Malfunction
 Moisture in the System

Note: 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 at 1500 RPM, the blower on maximum and the thermostat set to maximum, should be approximately:

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 Indications:

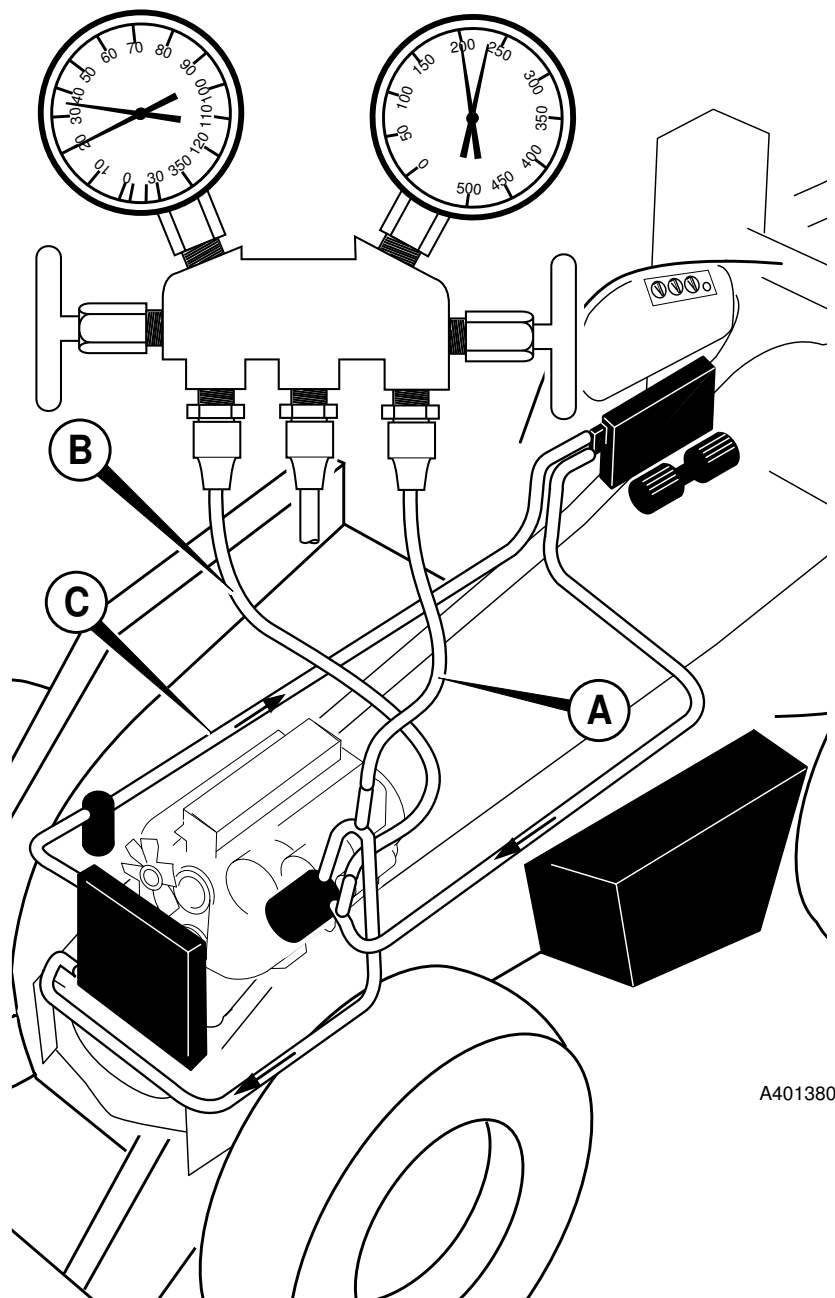
Sight Glass - Clear.
Discharge Air - Cold.

LOW SIDE (Blue)
 Normal

HIGH SIDE (Red)
 Normal

LOW SIDE - 2.0 bar (2.0 kgf/cm²)(29 lbf/in²)

HIGH SIDE - 14.8 bar (15.1 kgf/cm²)(215 lbf/in²)



Component Key:

A High Pressure/Temperature Gas.
B Low Pressure/Temperature Gas.
C High Pressure Liquid.

A401380

Air Conditioning - System Diagnosis (cont'd)

Low R-134a Charge

Gauge Readings:

Low Side Gauge - Low.

High Side Gauge - Low.

Other symptoms:

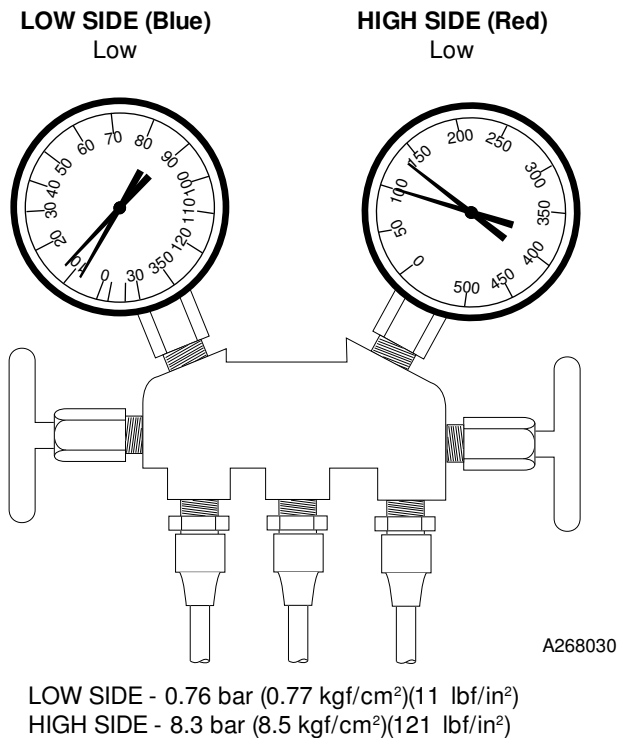
Sight Glass - Bubbles continuously visible.

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:

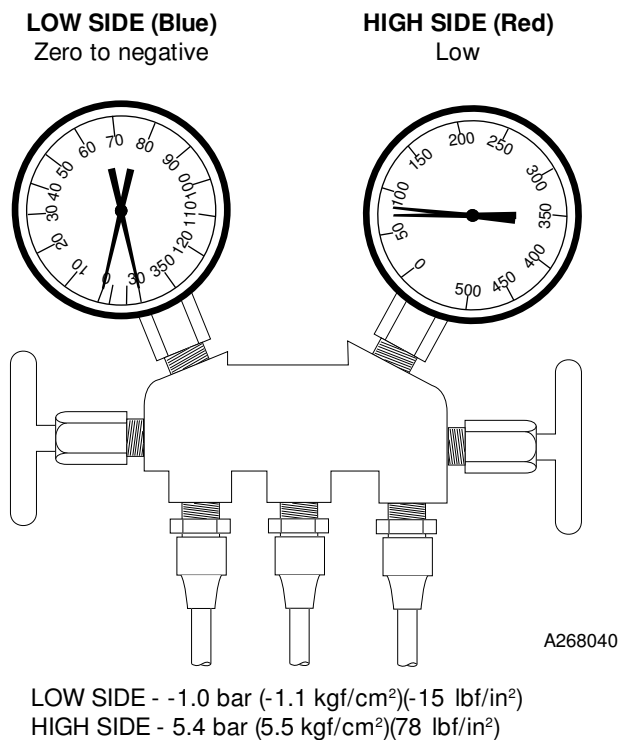
Receiver-Drier - Frost on tubes from receiver-drier to evaporator unit.

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.



Air Conditioning - System Diagnosis (cont'd)

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:

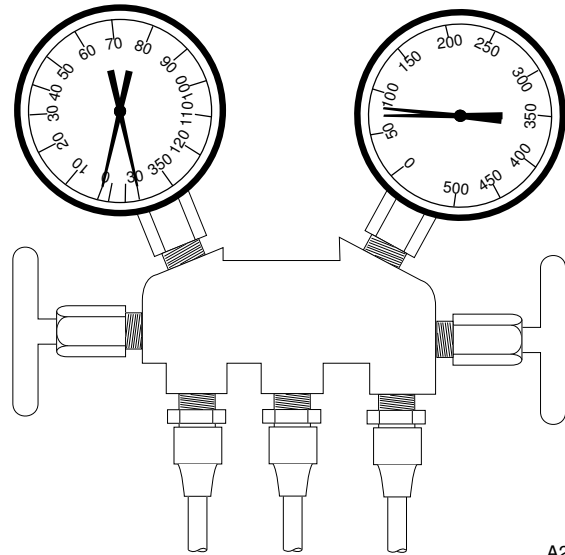
Refrigerant flow obstructed by dirt, moisture or gas leakage from expansion valve heat sensing tube.

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.

LOW SIDE (Blue)
Zero to negative

HIGH SIDE (Red)
Low



A268050

LOW SIDE - -1.0 bar (-1.1 kgf/cm²)(-15 lbf/in²)
HIGH SIDE - 5.4 bar (5.5 kgf/cm²)(78 lbf/in²)

Insufficient Cooling of Condenser or Refrigerant Overcharge

Gauge Readings:

Low Side Gauge - High.

High Side Gauge - High.

Other symptoms:

Sight Glass - No bubbles visible even at lower engine RPM.

Diagnosis:

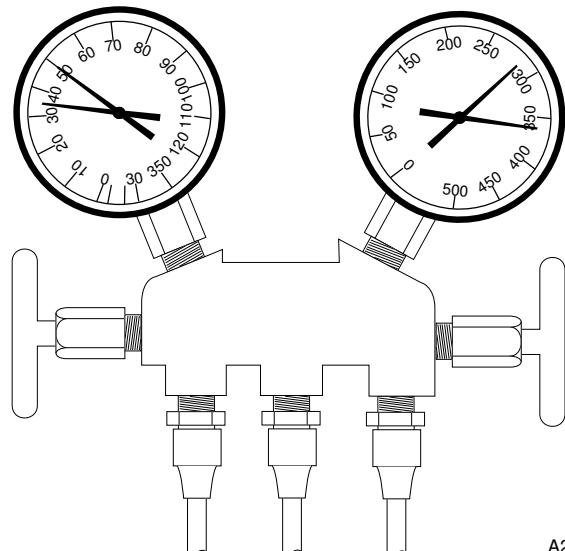
Refrigerant overcharge, condenser cooling fins clogged with dirt or cooling fans malfunctioning.

Correction:

1. Clean condenser cooling fins.
2. Check cooling fan operation.
3. Evacuate A/C system.
4. Charge system with R-134a.
5. Operate system and check performance.

LOW SIDE (Blue)
High

HIGH SIDE (Red)
High



A268060

LOW SIDE - 3.0 bar (3.0 kgf/cm²)(43 lbf/in²)
HIGH SIDE - 22.1 bar (22.5 kgf/cm²)(320 lbf/in²)

Air Conditioning - System Diagnosis (cont'd)

Air in System

Gauge Readings:

Low Side Gauge - High.

High Side Gauge - High.

Other symptoms:

Sight Glass - Bubbles visible during system operation.

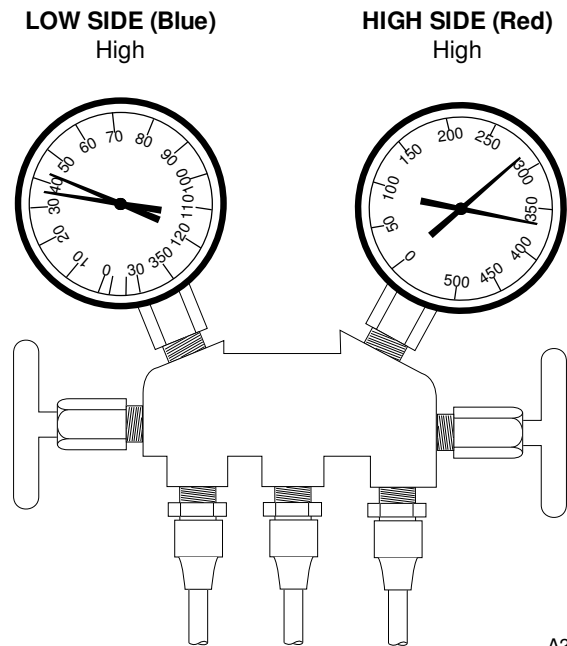
Pipes - Low pressure pipes are hot to the touch.

Diagnosis:

Air is present in the system, possibly from inadequate evacuation procedure.

Correction:

1. Evacuate A/C system.
2. Check compressor oil for contamination. Check compressor for proper oil amount. Correct if necessary.
3. Charge system with R-134a.
4. Operate system and check performance.



A268070

LOW SIDE - 2.8 bar (2.8 kgf/cm²)(40 lbf/in²)
HIGH SIDE - 22.1 bar (22.5 kgf/cm²)(320 lbf/in²)

Expansion Valve Improperly Mounted or Heat Sensing Tube Defective (Opening Too Wide)

Gauge Readings:

Low Side Gauge - High.

High Side Gauge - High.

Other symptoms:

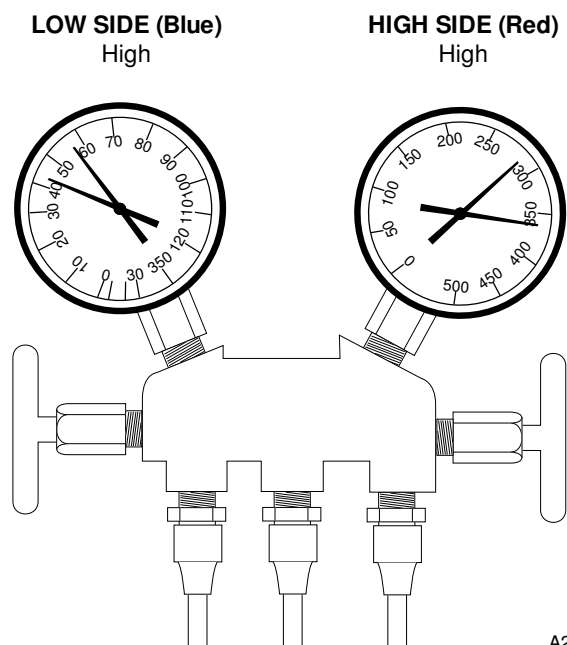
Pipes - Large amount of frost or moisture on low side pipes.

Diagnosis:

Excessive refrigerant in low side pipes possibly from expansion valve being opened too wide.

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.



A268080

LOW SIDE - 3.5 bar (3.5 kgf/cm²)(50 lbf/in²)
HIGH SIDE - 22.1 bar (22.5 kgf/cm²)(320 lbf/in²)

Air Conditioning - System Diagnosis (cont'd)

Compressor Malfunction

Gauge Readings:

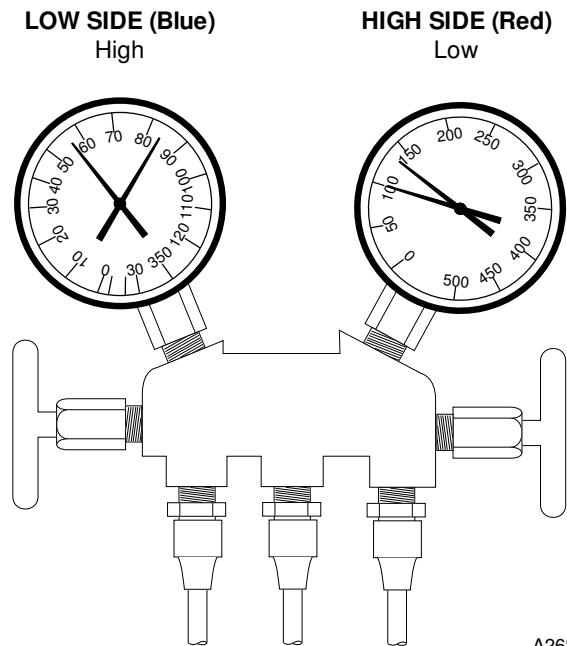
Low Side Gauge - High.
High Side Gauge - Low.

Diagnosis:

Internal compressor leak or compressor mechanically broken.

Correction:

1. Evacuate A/C system.
2. Repair or replace compressor.
3. Charge system with R-134a.
4. Operate system and check performance.



A268090

LOW SIDE - 4.9 bar (5.0 kgf/cm²)(71 lbf/in²)
HIGH SIDE - 8.3 bar (8.5 kgf/cm²)(121 lbf/in²)

Some Moisture in the System

Gauge Readings:

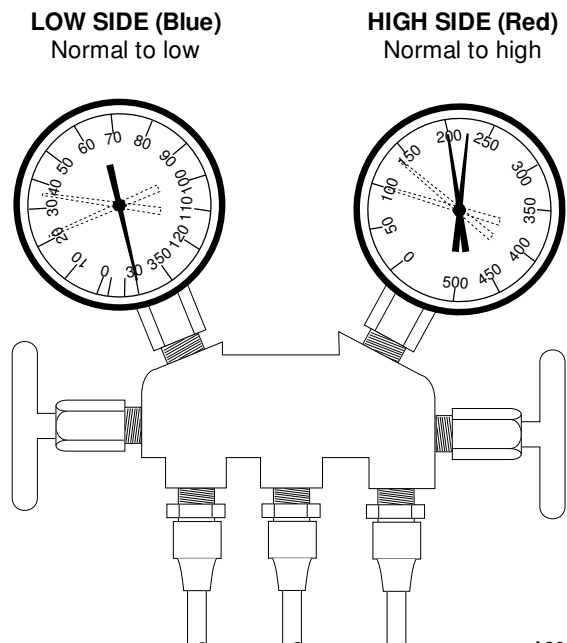
Low Side Gauge - Normal, then sometimes drops to below zero.
High Side Gauge - Normal, then sometimes goes high.

Diagnosis:

Moisture in system freezes, temporarily stopping cycle, normal system operation returns when ice melts.

Correction:

1. Evacuate A/C system.
2. Replace receiver-drier.
3. Remove moisture by repeatedly evacuating system.
4. Charge system with R-134a.
5. Operate system and check performance.



A268020

LOW SIDE - -2.1 bar (-2.1 kgf/cm²)(-30 lbf/in²)
HIGH SIDE - 14.8 bar (15.0 kgf/cm²)(214 lbf/in²)

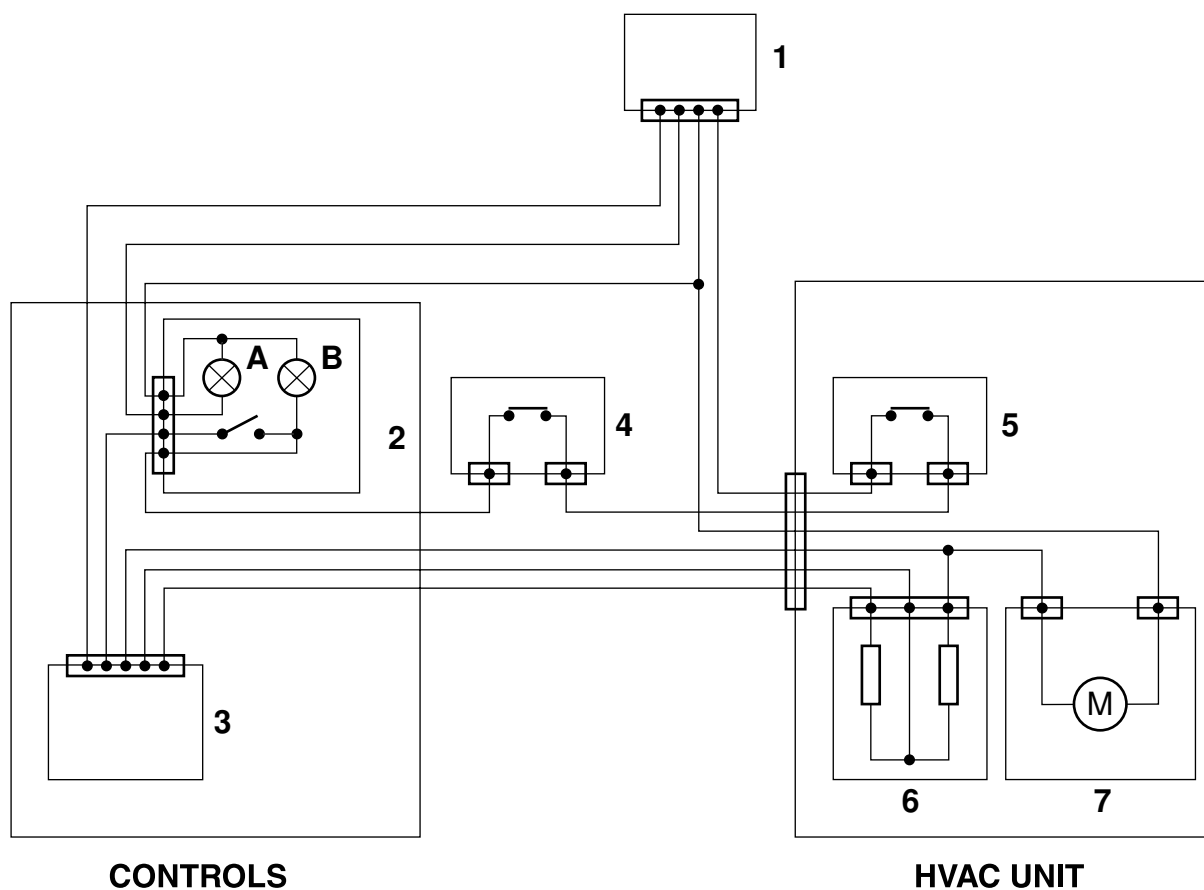
Air Conditioning (cont'd)

Wiring Continuity Checks

Use the illustration below to complete continuity checks on the HVAC/air conditioning system and heater harness wires. The harness connects to the main machine harness via connector 1. Refer also to the main machine circuit diagram in Section C **Electrics**.

Component Key:

- 1 Main Machine Harness Connector
- 2 Air Conditioning ON/Off Switch
- 2A Panel Illumination Bulb
- 2B Switch Illumination Bulb
- 3 Blower Switch
- 4 Binary Pressure Switch
- 5 Freeze Protection Thermostat
- 6 Blower Speed Resistor
- 7 Blower Unit Motor



A401410

Air Conditioning

Leak Testing

Note: The refrigerant is heavier than air and will leak downwards from the defective component. Check in still conditions but in a well ventilated area.

Hose or pipe connections are likely leakage points of any refrigerant circuit.

To test for leaks in the high pressure side of the system i.e. from the compressor output to the expansion valve, run the air conditioning for a few minutes then switch off the engine and test for leakage using an electronic leak detector.

To test for leakage in the low pressure side of the system, switch off the air conditioning and leave for a few minutes before testing.

WARNING

Leak testing in Air Conditioning systems should be carried out only in a well ventilated area.

BF 1-2

Tightening Leaking Hoses

WARNING

The air conditioning system is a closed loop system and contains pressurised refrigerant. No part of the system must be disconnected except by a qualified refrigeration engineer.

4-3-4-1

The refrigerant hoses have crimped ferrule end fittings. The hose connectors have an 'O' ring seal which compresses when the connection is tight, creating an air tight seal.

Hoses are used to connect the inlets and outlets of the compressor, condenser, receiver drier and expansion valve (the evaporator coil is connected to the expansion valve within the air conditioning unit using rigid pipes).

If leakage is detected from a hose connector, either by means of an electronic leak detector or soapy water, tighten the connector up and repeat the leakage test. If leakage is still evident, it will be necessary to de-gas the system and renew the connector 'O' ring seal.

The 'O' rings used on an R-134a refrigerant system are of an HNBR compound and are colour coded green. These 'O' rings must be used as some 'O' ring materials can become porous to R-134a systems, resulting in leakage.

Checking Refrigerant Charge Level

The pressure in the system, i.e. the refrigerant charge level can be determined by checking the state of refrigerant at the receiver drier sight glass.

If the level of charge is correct the sight glass will be clear. If the charge is low bubbles will be seen. Bubbles may also be an indication of inadequate cooling, due to a restriction of air flow around the condenser coil. Recharging of the system should be carried out by an air conditioning engineer. Check refrigerant charge level as follows:

- 1 Park the machine on firm, level ground. Lower the backhoe and loader to the ground.
- 2 Remove the starter key.
- 3 Remove the front grille.

WARNING

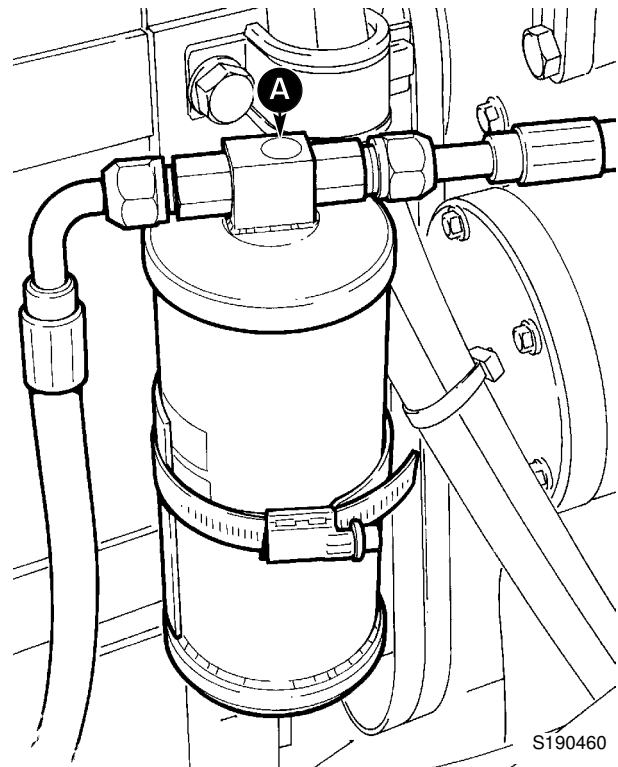
When the engine is turning, there are parts rotating in the engine compartment.

Before starting this job make sure that you have no loose clothing (cuffs, ties etc) which could get caught in rotating parts.

When the engine is turning, keep clear of rotating parts.

2-3-3-10

- 4 Start the engine and run at idle. Switch air conditioning ON to circulate refrigerant.
- 5 Check refrigerant charge level at sight glass **A**.



Air Conditioning

- Refrigerant Charging and Discharging

Note: The procedures for refrigerant charging and discharging must only be carried out by qualified service personnel who have received specialist training on the air conditioning system.

⚠ WARNING

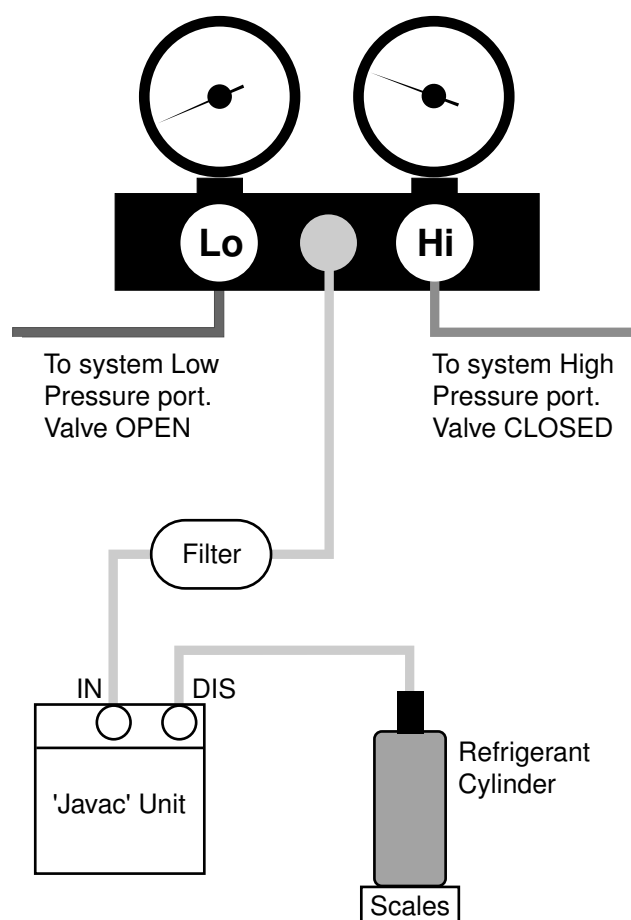
The air conditioning system is a closed loop system and contains pressurised refrigerant. No part of the system should be disconnected until the system has been discharged by a refrigeration engineer or a suitable trained person. You can be severely frostbitten or injured by escaping refrigerant.

4-3-4-1/2

Refrigerant Recovery

The recovery process clears the system refrigerant prior to servicing or for refrigerant renewal.

- 1 Ensure that the engine is OFF and the starter key removed.
- 2 Connect the manifold to the system as shown, with the blue hose connected to the system low pressure port. DO NOT connect the red hose. Make sure that both valves are closed.
- 3 Connect the yellow hose to the 'Javac' unit filter.
- 4 Connect the filter to the 'Javac' unit.
- 5 Connect the 'Javac' unit to an empty receiver bottle. Weigh the bottle before and after filling to assess system capacity.
- 6 Switch on 'Javac' unit and open the low pressure manifold valve.
- 7 The 'Javac' unit will automatically switch off when a pressure balance exists between the system and the receiver bottle. Switch off 'Javac' at main switch, but leave the system connected. Switch on after 10 minutes, the 'Javac' will restart if residual pressure remains.
- 8 Close valves and remove equipment.



A396820

Notes:

DO NOT fill the receiver bottle to more than 80% by weight.

DO NOT re-use refrigerant unless you are aware of its purity.

If the high pressure warning light on the 'Javac' unit comes on, throttle back the manifold low pressure valve to provide a restriction.

The JCB recommended 'Javac' unit only recovers refrigerant as a gas. Other units can recover refrigerant as a liquid and/or gas. ALWAYS check manufacturers instructions before using.

Air Conditioning

- Refrigerant Charging and Discharging

Note: The procedures for refrigerant charging and discharging must only be carried out by qualified service personnel who have received specialist training on the air conditioning system.

⚠ WARNING

The air conditioning system is a closed loop system and contains pressurised refrigerant. No part of the system should be disconnected until the system has been discharged by a refrigeration engineer or a suitable trained person. You can be severely frostbitten or injured by escaping refrigerant.

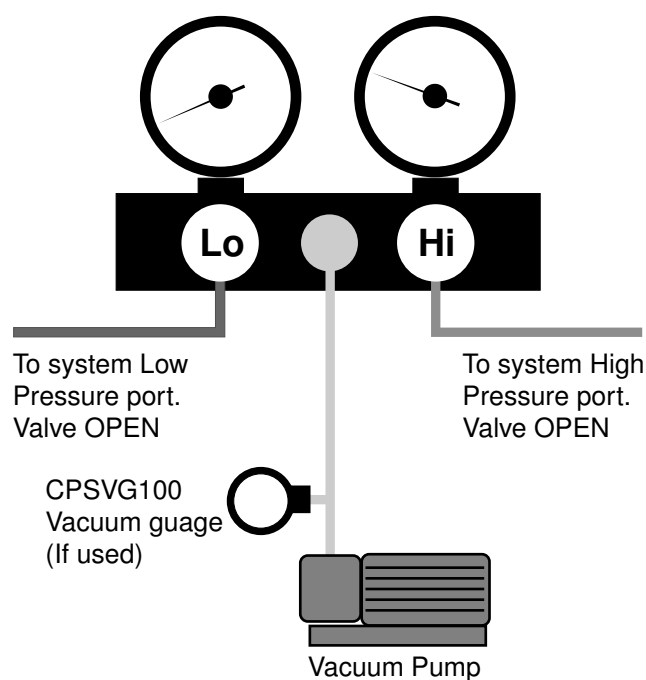
4-3-4-1/2

Evacuating (Vacuuming)

This procedure follows on from the 'Recovery' process and is necessary to ensure proper refilling of the system with refrigerant.

To avoid leakage in the vacuum system itself, DO NOT use extensions to the yellow hose (use standard 2 metre length).

- 1 Recover all refrigerant from the system as described in **Refrigerant Recovery**.
- 2 Close all valves and connect the manifold as shown. Connect the blue hose to the system low pressure port and the red hose to the high pressure port.
- 3 Connect the yellow hose to the vacuum pump.
- 4 Open manifold valves.
- 5 Switch on the vacuum pump until 740mm (29 in) mercury vacuum reads on both gauges.
- 6 Maintain suction for approximately 30 minutes.
- 7 Close valves and remove equipment.

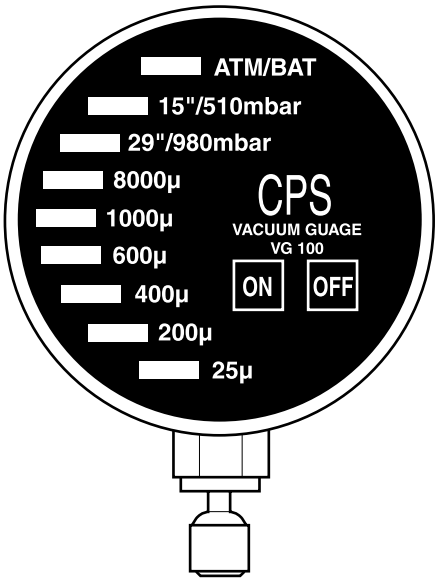


A396780

Notes:

If the vacuum falls rapidly the system is leaking. Check all connections and reseal. If the point of leakage is not obvious, recharge the system and test again. Refer to **Service Procedures, Air Conditioning - Leak Testing**.

Achievable vacuum will vary with altitude. Maximum gauge reading will be 25mm (1 in) less for every 305 metres (1000 feet) above sea level.



A396790

Electronic Vacuum Gauge

The CPS VG100 vacuum gauge is an electronic type using LED's to indicate various states of vacuum. It is used in place of or to supplement the gauge on the vacuum pump.

Before connecting into the system switch on to check that the first LED lights to show that the battery is in good condition.

Note: The indicator lights show pressure in inches of mercury (Hg) and vacuum in microns (0.001mm Hg).

ATM/BAT	Normal atmospheric pressure reading. Battery condition.
15"/510mbar	381mm (15 in)Hg. Partial vacuum - Vacuum system is operating.
29"/980mbar	736mm (29 in)Hg. No vacuum drawn - Possible system leakage.
8000μ	8.0mm (0.31 in)Hg. Partial vacuum - If the reading does not progress the system may have a slow leak.
1000μ	1.0mm (0.039 in)Hg. Deeper vacuum.
600μ	0.6mm (0.023 in)Hg. Deep vacuum.
400μ	0.4mm (0.015 in)Hg. Deep vacuum.
200μ	0.2mm (0.0078 in)Hg. Deep vacuum.
25μ	0.025mm (0.00098 in)Hg. Pump Test. Maximum sustainable vacuum.

Air Conditioning

- Refrigerant Charging and Discharging

Note: The procedures for refrigerant charging and discharging must only be carried out by qualified service personnel who have received specialist training on the air conditioning system.

⚠ WARNING

The air conditioning system is a closed loop system and contains pressurised refrigerant. No part of the system should be disconnected until the system has been discharged by a refrigeration engineer or a suitable trained person. You can be severely frostbitten or injured by escaping refrigerant.

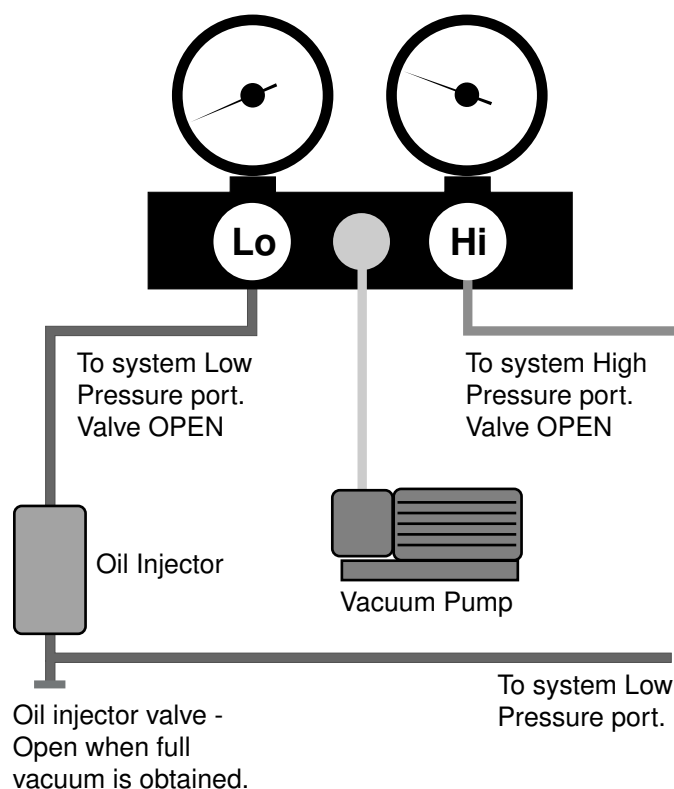
4-3-4-1/2

Relubricating

Pre-lubrication is essential after recovering system refrigerant, vacuuming and component flushing.

The system should be evacuated to a vacuum of 740mm (29 in) of mercury before re-lubricating.

- 1 Ensure that the engine is OFF and the starter key is removed.
- 2 Close all valves and connect the manifold as shown, with the blue hose connected to the oil injector and the red hose to the system high pressure port.
- 3 Connect the yellow hose to the vacuum pump.
- 4 Connect the other end of the oil injector to the system low pressure point.
- 5 Switch on the vacuum pump and open the high pressure side valve.
- 6 Unscrew the oil injector cap and add the specified quantity of refrigerant oil.
- 7 When 740mm (29 in) mercury shows on the vacuum gauge, open the oil injector valve to allow the oil into the system.
- 8 If more oil is needed repeat the above procedure. The quantity of oil should be the same as that taken out during the '**Recovery**' procedure.



A396800

Notes:

Use only PAG oil in R-134a systems.

Air Conditioning

- Refrigerant Charging and Discharging

Note: The procedures for refrigerant charging and discharging must only be carried out by qualified service personnel who have received specialist training on the air conditioning system.

WARNING

The air conditioning system is a closed loop system and contains pressurised refrigerant. No part of the system should be disconnected until the system has been discharged by a refrigeration engineer or a suitable trained person. You can be severely frostbitten or injured by escaping refrigerant.

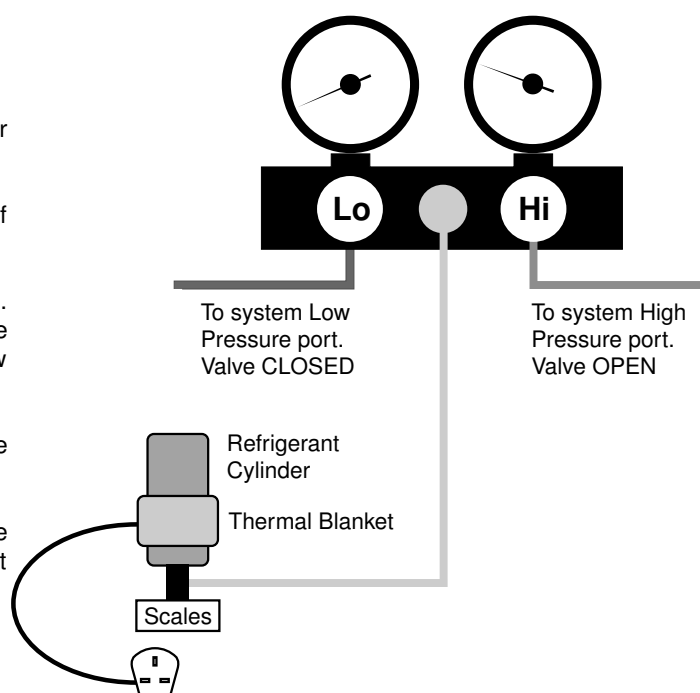
4-3-4-1/2

Charging

This procedure is industry recommended practice for refilling air conditioning systems with refrigerant.

Evacuate the system beforehand to 740mm (29 in) of mercury.

- 1 Close all valves and connect the manifold as shown. Connect the blue hose to system low pressure and the red hose to system high pressure. Connect the yellow hose to the refrigerant cylinder.
- 2 Invert single valve cylinder on the scales and zero the scale reading (see **Notes:** for twin valve cylinders).
- 3 Slowly open the high pressure valve and allow the vacuum to draw-in refrigerant to the specified weight for the system. Refer to **Technical Data**.
- 4 Close all valves and remove the equipment.



A396810

Notes:

Add refrigerant as a LIQUID, not as a gas. Some refrigerant cylinders have separate valves for gas and liquid. Be sure to connect to the liquid port when following the above procedure.

Refrigerant can be used either in gas or liquid form. If recharging with gas follow the manufacturers instructions and recharge only via the low pressure port. DO NOT use liquid refrigerant at the low pressure port.

Add refrigerant until the scales indicate the specified weight for the system or the weight obtained when the system refrigerant was previously recovered.

To speed up the process a thermostatically controlled thermal blanket can be used around the replenishing cylinder.

Air Conditioning

Binary Pressure Switch Testing

The binary pressure switch assembly comprises a low pressure switch designed to open at 1.96 bar (28.4 lbf/in²) and a high pressure switch designed to open at 27.5 bar (400 lbf/in²)

When the refrigerant pressure is within the 1.96 and 27.5 bar limits the switches will be closed and providing the freeze protection thermostat and ON/OFF switches are closed, a current will be supplied to the field coil of the clutch. Through electro- magnetic action the field coil clutch will be pulled towards the compressor's clutch and the refrigeration cycle will commence.

If the fault finding table indicates that the pressure switch assembly is defective the fault may be electrical or due to incorrect system pressure.

Refer to **Checking Refrigerant Charge Level**. If the refrigerant charge level is OK use the following electrical test procedures.

- 1 Switch the engine off so that the air conditioning system cannot operate.
- 2 Disconnect the binary pressure switch harness from the side console harness and connect an external 12V power supply between the pressure switch harness connector and chassis. If both pressure switches are working correctly, and the system is at the correct charge level, the compressor clutch will operate.

If the compressor clutch does not operate with the external power supply, one of the pressure switches in the assembly is faulty or the level of refrigerant charge is insufficient to close the low pressure switch.

- 3 Replace the pressure switch assembly. Refer to **Binary Pressure Switch - Removal and Replacement**. If the clutch still fails to operate check all electrical connections.

Air Conditioning

Condenser Matrix

It is likely that over a period of time, because of the machine's working environment, the airflow around the condenser matrix will become restricted due to a build up of airborne particles.

If the build up of particles is severe, heat dissipation from the refrigerant to the air will be significantly reduced, resulting in poor air conditioning performance.

In extreme cases, over pressurisation of the system occurs, causing the high pressure cut out switch to operate and switch off the system.

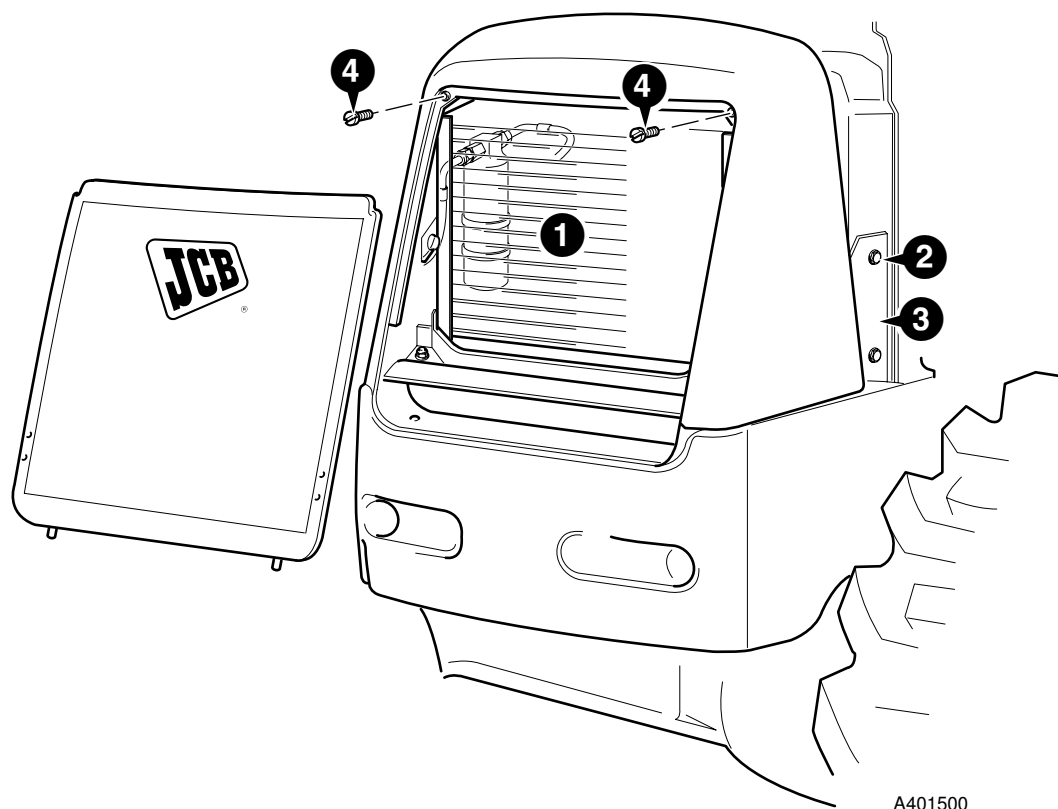
High pressure cut out can also be caused by an internal blockage of the condenser matrix.

Condenser Matrix Cleaning

Take care not to damage the condenser fins or tubes. Damaged fins must be straightened out to ensure a good airflow through the matrix.

- 1 Park the machine on firm level ground. Raise and block the loader arms. Lower the backhoe to the ground and stop the engine.

- 2 Remove the starter key.
- 3 Remove the front grille.
- 4 Remove both side panels.
- 5 Support the condenser 1.
- 6 Undo the nuts and bolts 2 at the three mounting brackets 3.
- 7 Remove the screws 4 fixing the condenser to the mounting brackets. Remove the brackets 3 to enable the condenser to be moved away from the radiator. This can be done without removing the hoses i.e. with the system fully charged.
- 8 With the condenser fully supported, use compressed air or low pressure water to backflow through the matrix fins. Take care not to damage the fins.
- 9 Refit the condenser matrix by reversing the removal procedure. Refit both side panels and bonnet.
- 10 Run the air conditioning and check cooling performance.



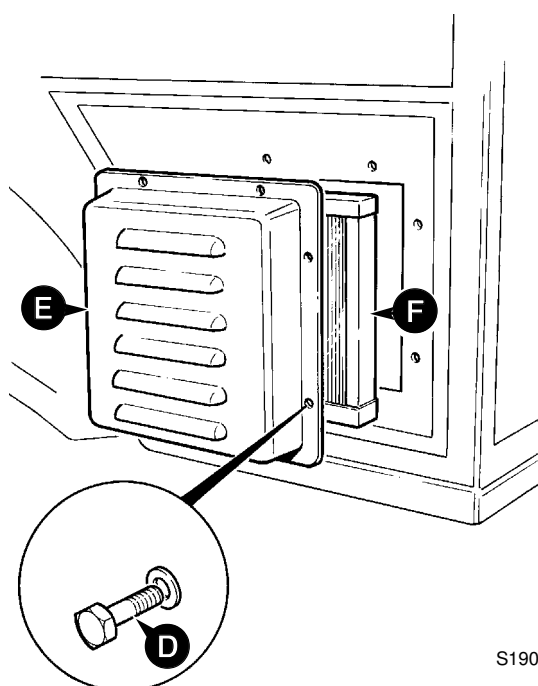
Air Conditioning

Filters - Changing and Cleaning

Air Intake Filter

- 1 Stop the engine and remove the starter key.
- 2 Remove Screws **D**, air intake cover **E** and filter **F**.

Clean filter element using compressed air. Refit filter into the cover and refit.



S190470

Air Conditioning

Compressor Drive Belt - Adjusting

- 1 Park the machine on firm level ground. Raise and block the loader arms. Lower the backhoe to the ground and stop the engine.
- 2 Remove the starter key.

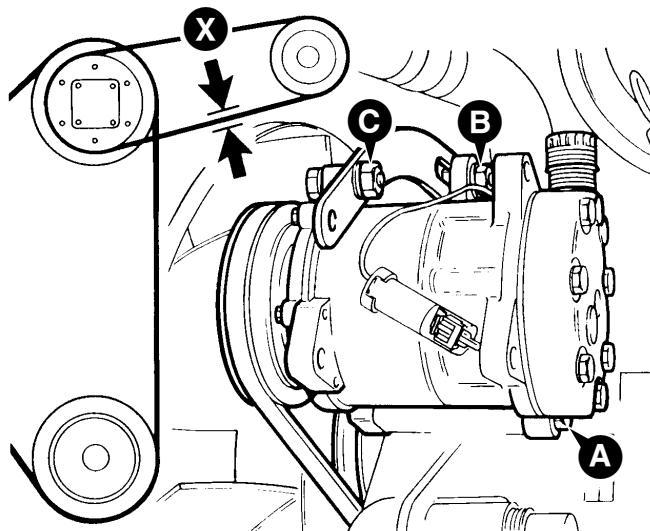
⚠ WARNING

Make sure the engine cannot be started. Disconnect the battery before doing this job.

2-3-3-5

- 3 Raise the Bonnet
- 4 Remove both Side Panels
- 5 Loosen pivot fastening bolt **A**. Loosen adjustment link fastening bolts **B** and **C**.
- 6 Position the compressor so that there is approximately 10 mm (3/8 in) slack at point **X** midway along the belt.
- 7 Tighten bolts **A**, **B** and **C**. Make sure that bolt **A** is the last to be tightened.

Note: If a new belt is fitted, check the belt tension after the first 20 hours of operation.



S209393

Glazing

The glass panes on the cab are all direct glazed.

Direct Glazing

The following procedures explain how to correctly remove and install panes of glass that are directly bonded to the cab frame apertures. When carrying out the procedures, relevant safety precautions must be taken:

- 1 Always wear safety glasses during both removal and replacement.
- 2 Use protective gloves - heavy duty leather gauntlet type gloves when cutting out the broken glass; 'non-slip' type gloves when handling/moving panes of glass; surgical type gloves when using the polyurethane adhesives.
- 3 Wear protective overalls.
- 4 DO NOT smoke - the activators and primers used in the procedures are highly flammable.
- 5 Do not attempt to handle or move panes of glass unless you are using glass lifters (see **Service Tools**).

Removing the Broken Glass and Old Sealant

Several special tools are required to successfully complete the removal and replacement procedures. Reference is made to the tools in the text. The majority of these tools can be obtained locally and the remainder from JCB Service (see **Service Tools**).

The work must only be carried out in a dry, frost free environment. A protective canopy may be required or the machine/frame must be moved to a sheltered area. In damp or wet conditions, hinged doors and window frames can be removed from the machine and taken to a more suitable (dry) environment.

Glass should not be replaced at temperatures below 5°C (41°F).

Note: The front screen glass is laminated, the other glass is toughened. If a laminated pane breaks it will stay in one piece even though the glass is cracked. A toughened pane will shatter and fall apart. The method of removal of the glass depends upon which type it is. See WARNING below.

WARNING

Always wear safety glasses when removing or installing screen glass. Never use a power operated knife when removing the sealant around a toughened glass screen. The action of the knife could cause particles of glass to be thrown with sufficient force to cause serious injury, even when safety glasses are being worn. Use only hand operated tools when working with toughened glass.

BF 2-3/1

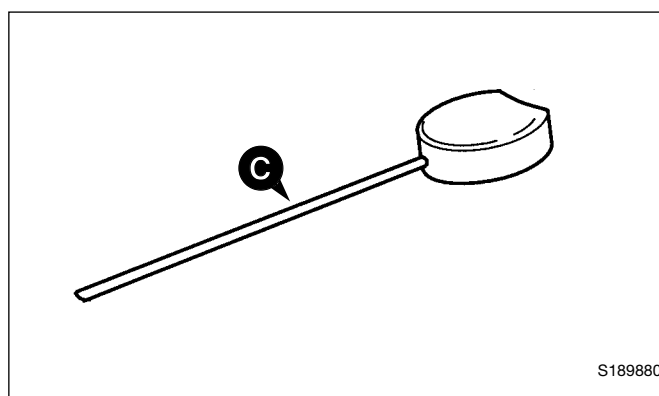
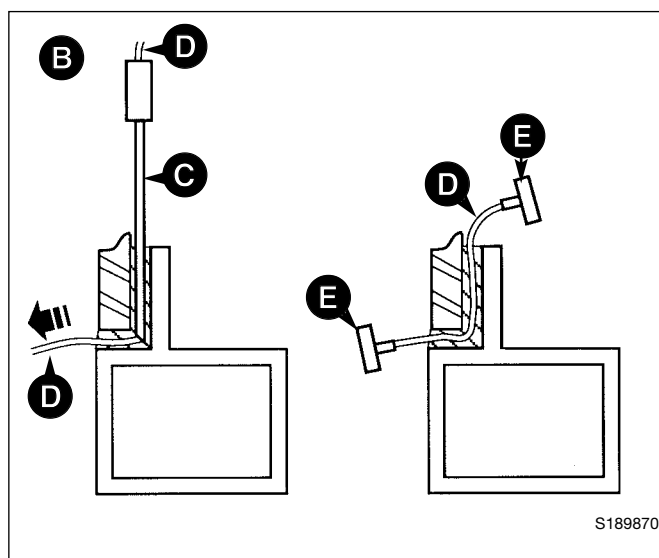
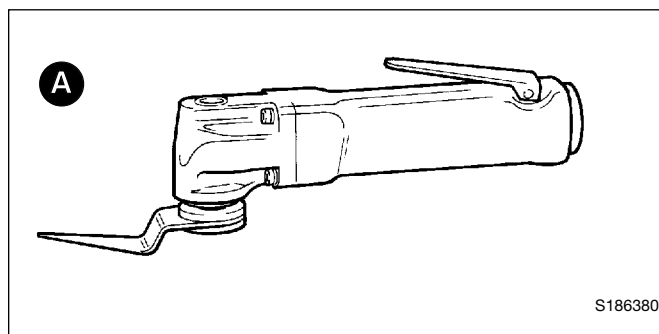
Direct Glazing (cont'd)

Removing the Broken Glass and Old Sealant (cont'd)

- 1 Position the machine on level ground and apply the parking brake. Stop the engine. Put protective covers over the cab seat and control pedestals.
- 2
 - a Laminated glass - leave installed until the old sealant has been cut away, after which it will be possible to lift the broken screen away from its frame housing in one piece.
 - b Toughened glass - remove as much of the shattered glass as possible prior to cutting out the old sealant.
- 3 Cut out the old sealant, leaving approximately 1 to 2 mm on the cab frame. There are several tools and techniques for doing this:
 - a Pneumatic Knife **A** provides one of the easiest methods of removing the sealant around laminated glass. The tool, powered by compressed air, should be sourced locally.

Note: This tool must not be used on toughened glass (see WARNING on previous page).

- (i) Press the handle to start the knife blade oscillating.
 - (ii) Insert the knife blade into the sealant.
 - (iii) Slowly move the knife along the sealant with the blade positioned as close to the glass as possible. Do not allow the knife blade to overheat or the sealant will melt.
- b Braided Cutting Wire and Handles **B**. This method uses a 3-core wire, a wire starter tube and two handles (see **Service Tools**).
 - (i) Insert the steel tube **C** into the old sealant on the inside of the glass.
 - (ii) Insert the braided cutting wire **D** down the centre of the steel tube. If necessary, from the outside, cut out local sealant at the point of the tube to gain access to the wire.
 - (iii) Using suitable pliers, pull the cutting wire through the sealant to the outer side of the glass.
 - (iv) Secure each end of the braided cutting wire in the special handles **E**.
 - (v) Move the cutting wire backwards and forwards in a sawing motion and at the same time gently push or pull the wire to cut through the old sealant.



Direct Glazing (cont'd)

Removing the Broken Glass and Old Sealant (cont'd)

- c** Cut-out Knife **F**. The cut-out knife can be used as a left handed or right handed tool. For the knife and its replaceable blades, refer to **Service Tools**.

- (i) Insert the knife blade into the sealant.
- (ii) Make sure that the blade of the knife is against the glass as shown at **G**.
- (iii) Use the 'pull-handle' to pull the knife along and cut out the old sealant.

- d** Craft Knife **H**. The blades are replaceable.

- (i) Insert the knife blade into the sealant.
- (ii) Pull the knife along and cut out the old sealant.

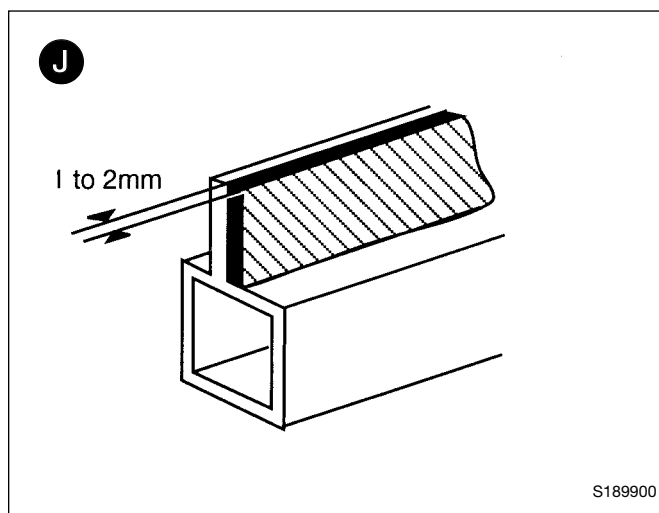
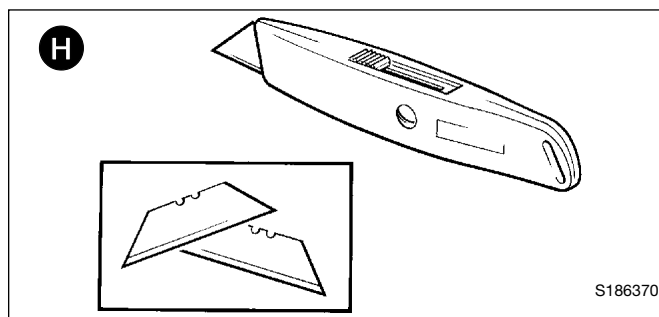
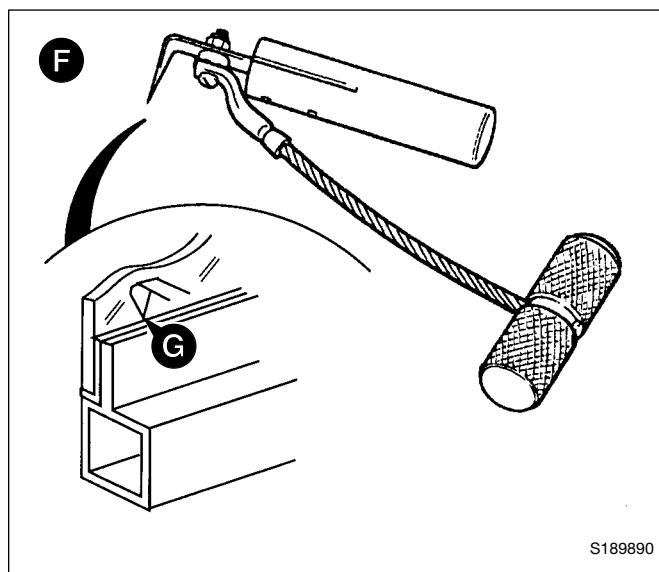
Note: There are other tools available to cut out the old sealant. For example, there is a long handle type craft knife to give extended reach. Refer to **Service Tools**, for details of this and any other tools.

- 4 a** Laminated glass - lift out the broken pane using glass lifters (see **Service Tools**).
- b** Toughened glass - remove the cut off sealant and all remaining particles of shattered glass.
- 5** If necessary, trim off the remaining old sealant to leave approximately 1 to 2 mm on the upright face of the cab frame aperture, as shown at **J**.
- 6** Apply a coat of 'Black Primer 206J' to the paintwork if:
 - a** Paintwork was damaged or scratched during the glass/sealant removal procedures.
 - b** The old sealant was inadvertently cut back to the cab frame during the glass/sealant removal procedures.

Preparing the Cab Frame Aperture

- 1** If damp or wet, dry the aperture area using a hot air gun (sourced locally).
- 2** Use 'Active Wipe 205' to thoroughly clean and 'prime' the trimmed sealant. Use a lint free cloth to apply the 'Active Wipe 205', allow 5 minutes flash off (drying) time.

Note: Do not use any other type of cleaning fluids, otherwise they may be absorbed into the old sealant and ultimately prevent the new glass from bonding.



Direct Glazing (cont'd)

Preparing the New Glass

CAUTION

The laminated front screen must be handled with extra care to prevent breakage. Wherever possible, store and handle it in a vertical attitude. When placing or lifting the screen in a horizontal attitude it must be supported over its whole area, not just at the edges.

BF 1-8

- 1 Make sure that the new glass correctly fits the frame aperture **K**.
 - a Put two spacer blocks **L** onto the bottom part of the frame aperture.
 - b Install the new glass on the spacer blocks - ALWAYS USE GLASS LIFTERS **M** (see **Service Tools**). Check that there is an equal sized gap all round the edge of the glass.

Note: The spacer blocks are rectangular in section to give two common gap widths. If necessary they can be trimmed to a smaller size to give an equal sized gap around the glass.

IMPORTANT: The glass edges MUST NOT touch the frame, otherwise movement of the frame will chip and eventually break the newly installed glass.

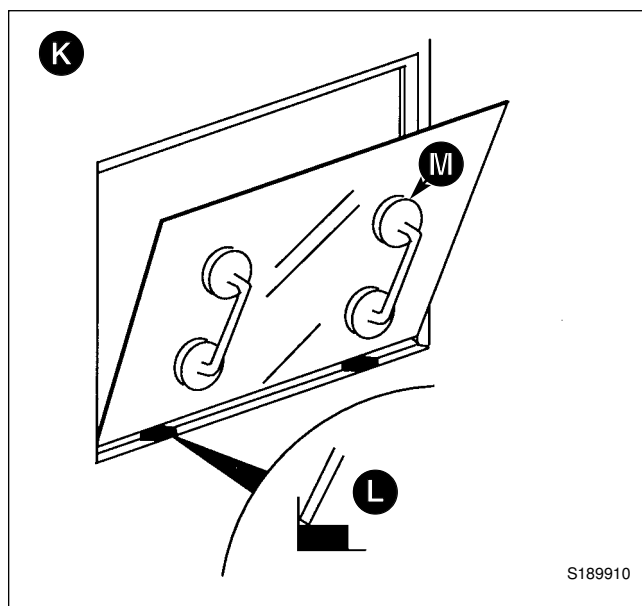
- 2 After checking for size, remove the new glass and place it on a purpose made glass stand **N** (see **Service Tools**).

Small panes of glass will need locating on a 600 x 700 mm x 15 to 19 mm thick plywood board **P** (sourced locally to fit the glass stand **N**). 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.

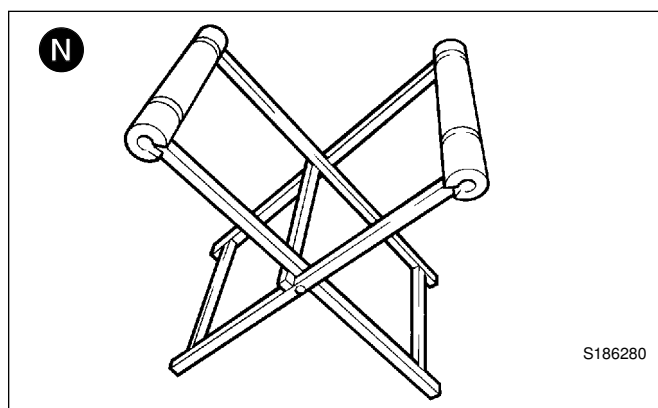
- 3 Make sure the glass is positioned on the stand the correct way up (i.e. with the black ceramic ink band upwards) ready for application of primer etc.
- 4 a Use 'Active Wipe 205' to thoroughly clean and 'prime' the black ceramic ink band printed on the glass (see Note 1). Use a lint free cloth to apply the 'Active Wipe 205', allow 5 minutes flash off (drying) time.

Note 1: Do not touch the glass after cleaning with the 'Active Wipe 205'.

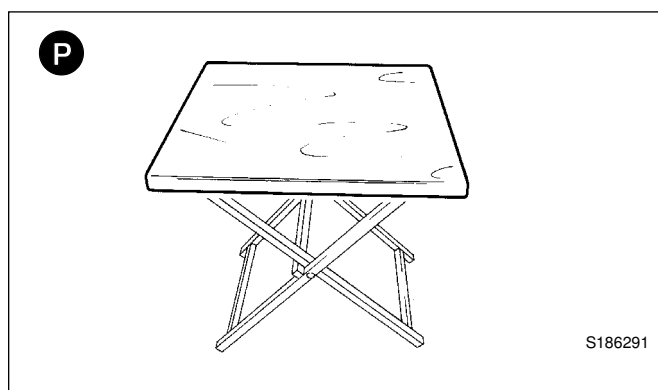
- b If the glass does not have a black ceramic ink band, paint a band on the glass using 'Black Primer 206J'. The band should be approximately 25mm (1in) wide, and the edge should be a neat straight line as shown at **R**.



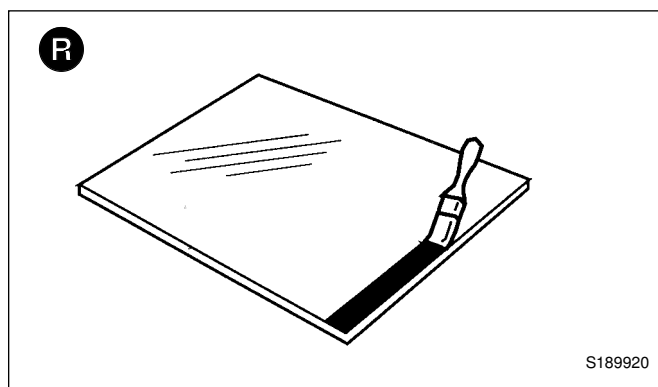
S189910



S186280



S186291



S189920

Direct Glazing (cont'd)

Preparing the New Glass (cont'd)

- 5 Install the Ultra Fast Adhesive cartridge (see **Sealing and Retaining Compounds** and Note 2 below) into a suitable applicator gun:
 - a Remove the aluminium disc cover from the base of the cartridge and discard the 'dessicant capsule'.
 - b Make sure that the rolled edge of the cartridge is not damaged - if necessary, the edges should be pressed flat, otherwise it will be difficult to remove the cartridge from the applicator gun.
 - c Pierce the front 'nozzle' end of the cartridge to its maximum diameter.
 - d Fit the pre-cut nozzle shown at S.
 - e Install the cartridge in the applicator gun.

Note 2: Cold material will be very difficult to extrude. The cartridges must be pre-heated in a special oven (see **Service Tools**) for 1 hour to a temperature of 80°C (176°F). Pre-heating the cartridges makes the adhesive more workable and also brings the 'curing' time down to 30 minutes.

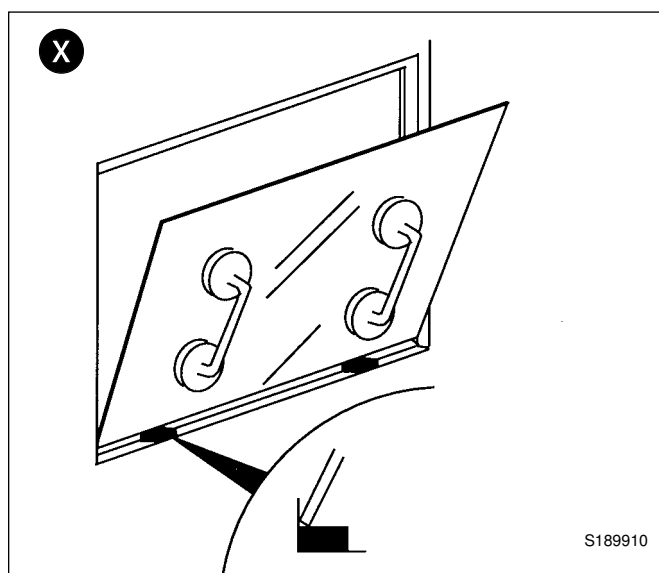
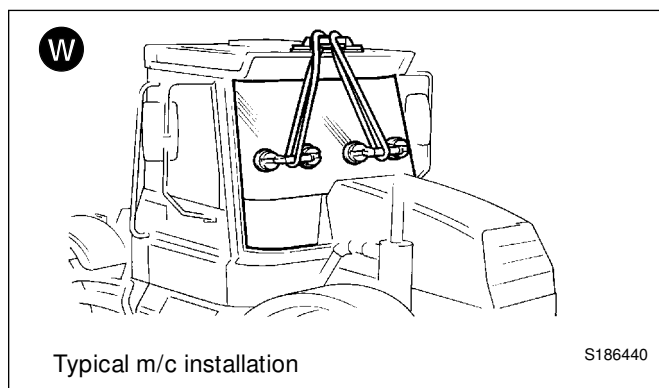
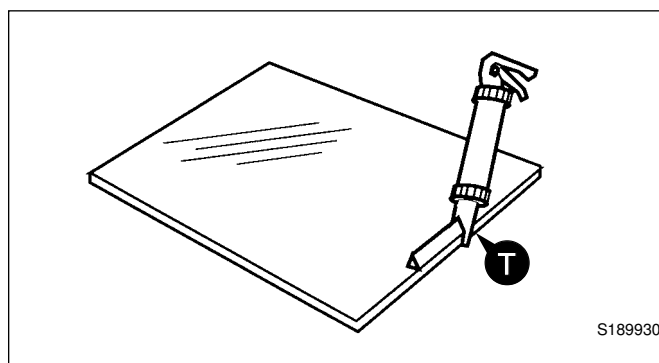
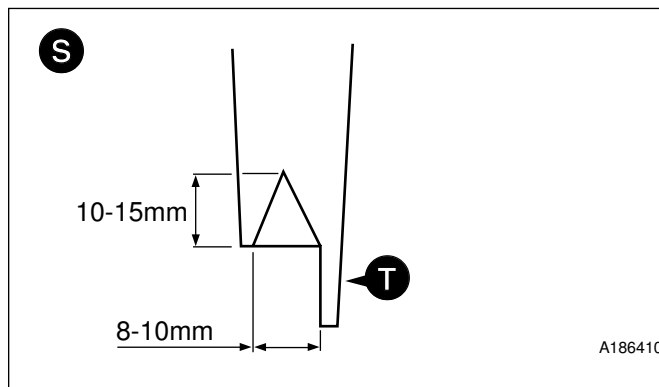
- 6 Apply the pre-heated adhesive to the glass (do not start in a corner). Keep the nozzle guide T against the edge of the glass and make sure that the adhesive forms a continuous 'pyramid' shape.

Note 3: Once the pre-heated adhesive has been applied to the glass, install the glass in the aperture as soon as possible. After approximately 10 minutes the sealant will form a 'skin', this will prevent the glass from bonding.

- 7 After applying the adhesive, leave a small amount of sealant protruding from the nozzle. This will prevent any adhesive left in the cartridge from 'curing'.

Installing the New Glass

- 1 Make sure the two spacer blocks are in position (see step 1 of **Preparing the New Glass**).
- 2 Install the glass in the frame aperture:
 - a ALWAYS use the special lifting tools when moving the glass. Use a lifting strap to hold large panes of glass in position as shown W.
 - b Sit the bottom edge of the glass on the spacer blocks as shown X.
 - c Make sure that the glass is correctly positioned, then gently press around the edges of the glass and ensure full adhesive contact is achieved. Do not press too hard or too much adhesive will squeeze out.



Direct Glazing (cont'd)

Installing the New Glass (cont'd)

- 3 Make the inside seal smooth:
 - a Wearing surgical gloves, dip your finger in a soapy water solution.
 - b Use your finger to make the inside seal smooth.
- 4 All exposed edges must be sealed using Black Polyurethane Sealant (see **Sealing and Retaining Compounds**).
- 5 Clean the glass after installation:

IMPORTANT: Use extreme caution when wiping the inside of the new glass - pushing too hard on the inside of the glass will affect the integrity of the bonded seal.

- a Small amounts of sealant can be cleaned from the glass using the 'Active Wipe 205'.
- b Large amounts of excess sealant should be left to 'cure' (see Note 4) and then cut off with a sharp knife.

Note 4: On completion of the glass replacement procedures, the sealant 'curing' time is 30 minutes. This means that the machine can be driven and used after 30 minutes, but it **MUST NOT** be used during the curing period of 30 minutes.

- c Clean the glass using a purpose made glass cleaner.
- 6 On completion of the glass installation procedures tidy the work area:
 - a Remove ALL broken glass from the cab area.
 - b Remove the protective covers from the cab seat and control pedestals.
 - c Renew all 'warning' and 'information' decals so that the new installation conforms with the original cab installation.

Cab ROPS/FOPS Structure - Checks

WARNING

The machine is fitted with a Roll Over Protection Structure (ROPS) and a Falling Objects Protection Structure (FOPS). You could be killed or seriously injured if you operate the machine with a damaged or missing ROPS/FOPS. If the ROPS/FOPS has been in an accident, do not use the machine until the structure has been renewed. Modifications and repairs that are not approved by the manufacturer may be dangerous and will invalidate the ROPS/FOPS certification.

INT-2-1-9/3

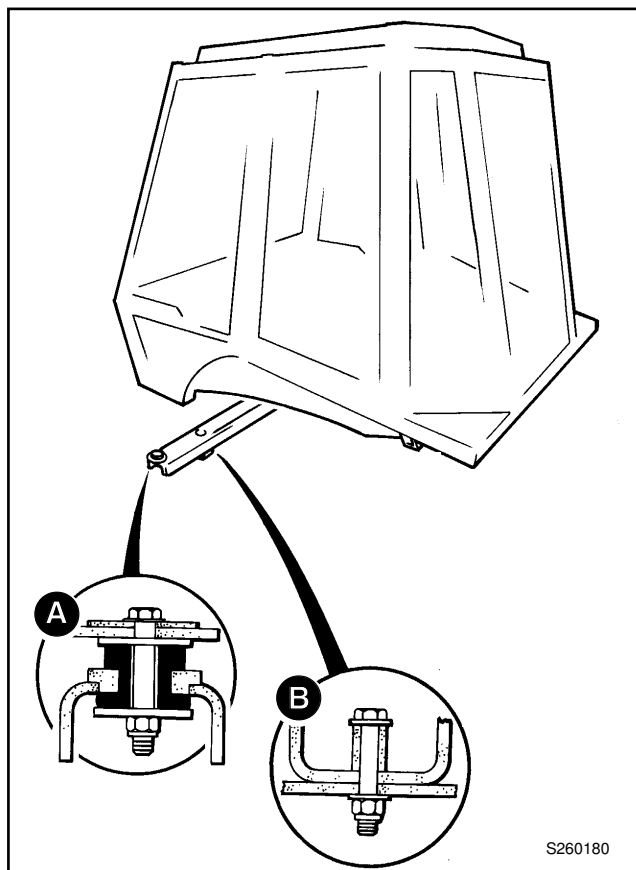
Failure to take these precautions could result in death or injury to the operator.

Check the structure for damage. Check that the mounting bolts are installed and undamaged. Check the bolt torques. Tighten them to the correct torque if necessary.

Torque Settings

Bolts **A** 205 Nm (150 lbf ft)

Bolts **B** 476 Nm (352 lbf ft)



Engine Panels

- Removing and Fitting

Instructions for removing and fitting the engine panels are described in the routine maintenance section, refer to Section 3 **Routine Maintenance - Engine Panels**.

Stabiliser Leg

Wear Pad Adjustment

Instructions for adjusting the wear pads are described in the maintenance section, refer to Section 3 **Stabiliser Legs - Wear Pad Adjustment**.

Extending Dipper - Wear Pad Adjustment

The Extradig dipper wear pads are bolt-on replaceable items. They support and guide the inner dipper section during extension and retraction. The following procedures explain how to inspect, and where applicable, adjust the pads.

There is a front and rear set of pads, each set comprises top wear pads **A** and bottom wear pads **B**.

The top wear pads **A** are not adjustable and must be replaced with new pads once they have worn to their limit. See **Inspecting the Top Wear Pads**.

The bottom wear pads **B** are adjustable and take up the wear on both the top and bottom pads. They must also be replaced with new pads once they have worn to their limit. See **Adjusting the Bottom Wear Pads**.

New wear pads **A** and **B** must be replaced as a set and fitted by a qualified service engineer.

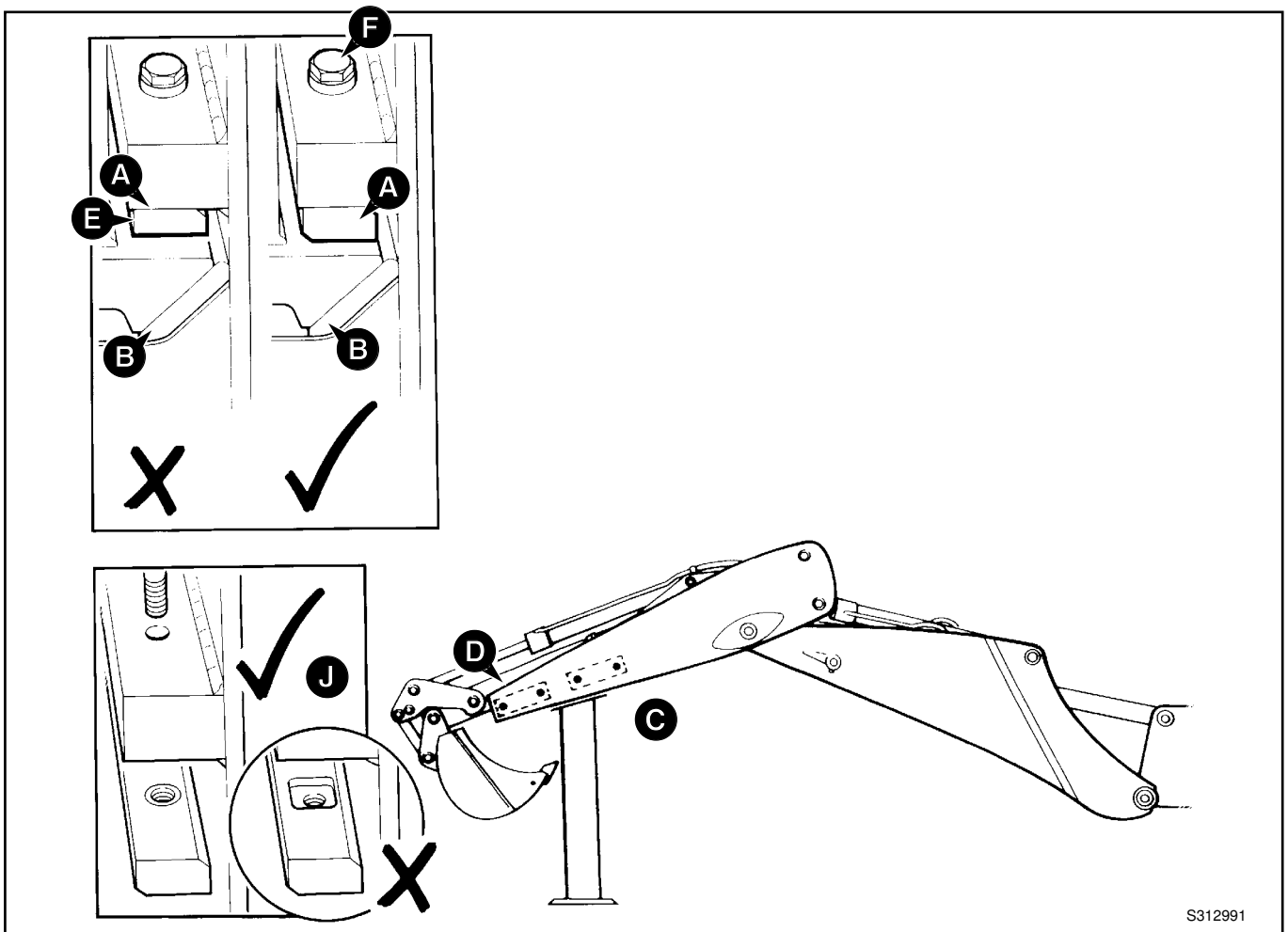
Inspecting the Top Wear Pads

- 1 Park the machine on level ground. Engage the parking brake and put the transmission in neutral.
- 2 Position the boom and dipper as shown at **C**. Retract the Extradig dipper **D**. Make sure that the bucket is clear of the ground and the dipper is supported.
- 3 Stop the engine and remove the starter key.

Renew the pads when, or before they are worn down to the depth of the recess/chamfer as shown at **E**. If the pads are worn near to their limit then inspect them more frequently than recommended in the Service Schedules. To avoid damage to the dipper or wear pad make sure the pads are fitted the correct way round as shown at **J**.

Torque Settings

Item	Nm	kgf m	lbf ft
F	56	5.7	4



S312991

Extending Dipper - Wear Pad Adjustment (Cont'd)

Adjusting the Bottom Wear Pads

- 1 Park the machine on level ground. Engage the parking brake and put the transmission in neutral.
- 2 Support the boom and dipper as shown at **C**.
- 3 Stop the engine.
- 4 Clean the sliding faces of the inner dipper with a suitable solvent.
- 5 Start the engine. Retract the Extradig dipper **D**. Make sure that the bucket is clear of the ground and the dipper is supported.
- 6 Stop the engine.
- 7 With grease, mud etc. removed from the sliding faces visually check the gap between inner dipper and top wear pad **A**, as shown at **G**. The gap should be no greater than 1.5 mm ($1/16$ in).

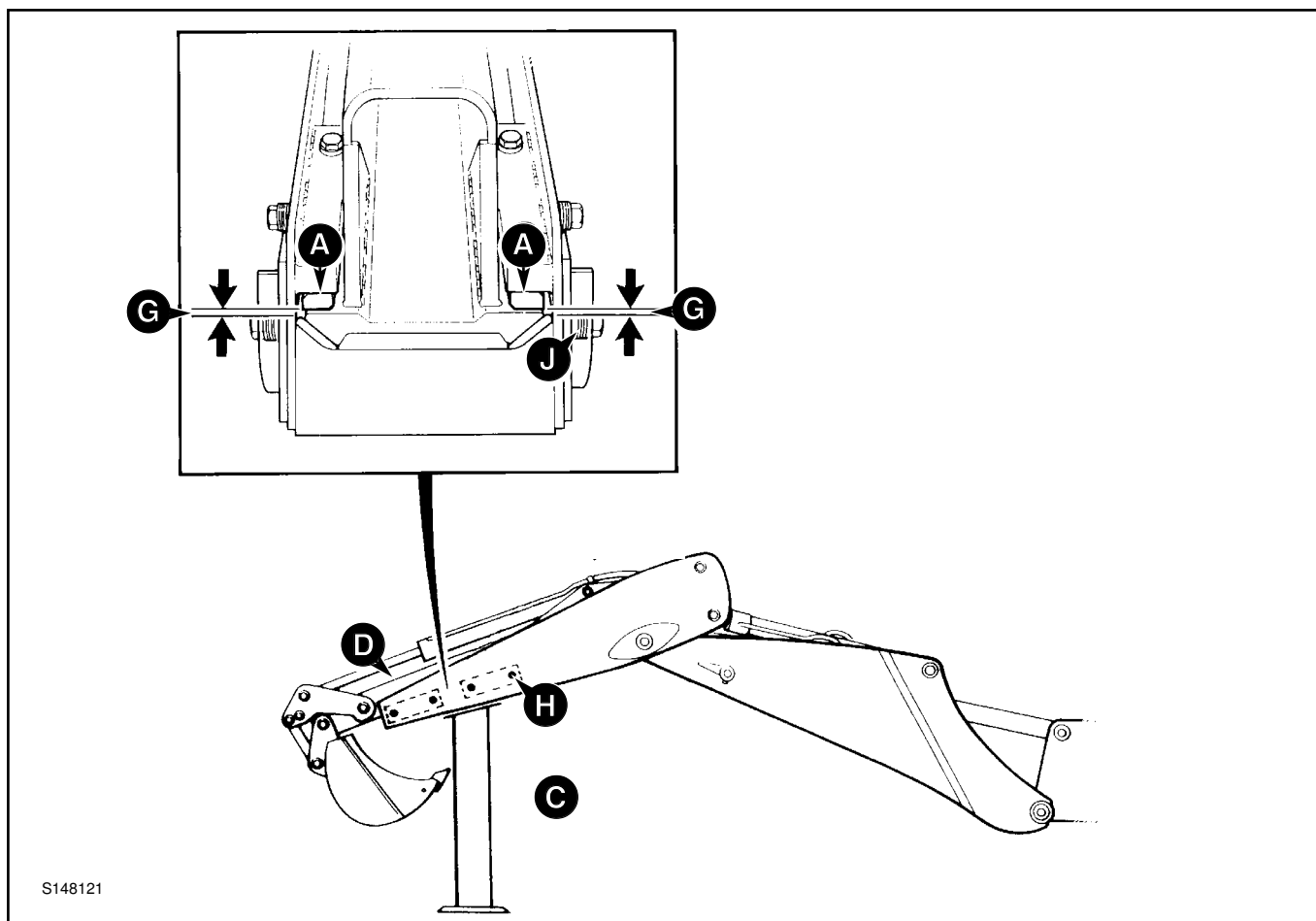
If the gap is greater than $1/16$ in (1.5 mm) then adjust as follows:

- a Remove one adjusting bolt **H** and discard one washer **J**.
- b Refit and tighten bolt **H**.
- c Repeat the procedure for the remaining 3 adjusting bolts **H** on the same side of the dipper.
- d Visually re-check the gap is no greater than 1.5 mm ($1/16$ in) as shown at **G**, if necessary repeat steps a to c for the other 4 bolts **H** on the opposite side of the dipper.
- e Make sure that the inner dipper seats central to the sides of the outer dipper.

Note: Remember to alternate sides each time an adjustment is made.

Note: When all the adjusting washers **J** have been removed and the clearance is greater than 1.5 mm ($1/16$ in), then wear pads **A** and **B** must be replaced as a set and fitted by a qualified service engineer.

When the adjustments have been completed, apply Waxoyl to the runners of the inner dipper.

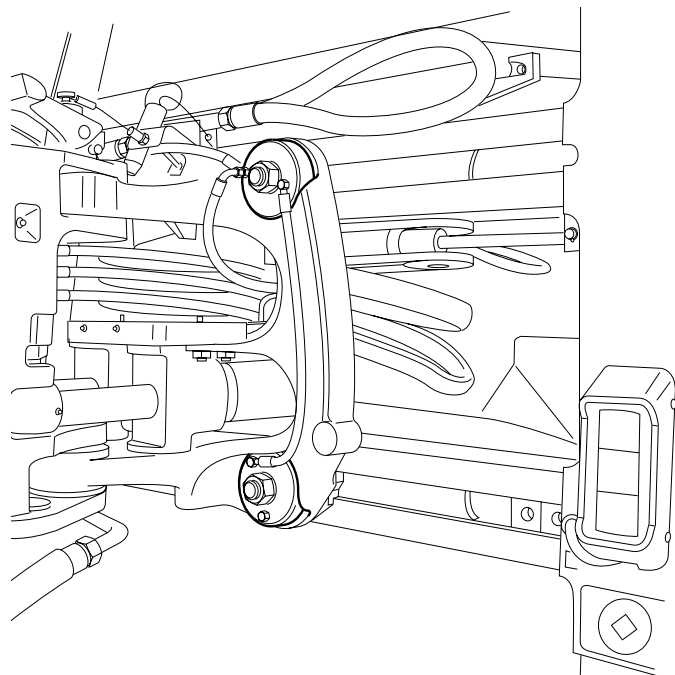
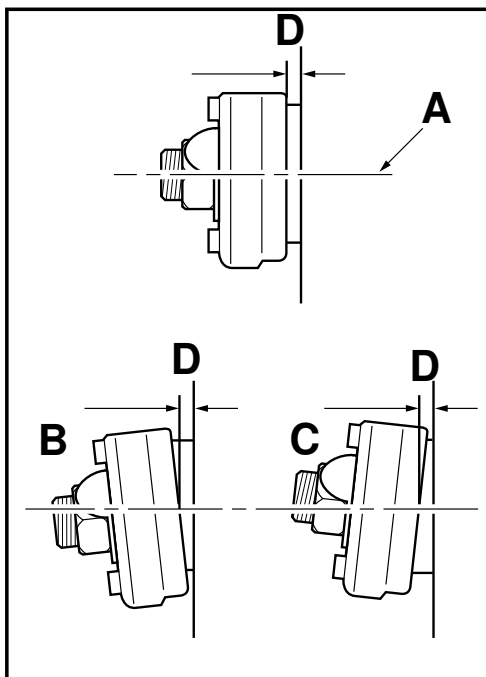


Sideshift**- Hydraclamp Clearance Setting**

If the kingpost clearance **D** is not set correctly leaks may occur or the seal could become dislodged, use the procedure below to set the clearance.

- 1 Park the machine on firm level ground, engage the parking brake and set the transmission to neutral. Lower the loader arms to the ground.
- 2 Select the carriage clamps to lock.
- 3 Measure all four clamps clearance, all measurements should be taken on the centre line **A** to allow for twisting of the clamp pot as shown at **B** and **C**:

Manual	3 - 5 mm (0.11 - 0.19 in)
Power Sideshift	3 - 5 mm (0.11 - 0.19 in)
- 4 Release the clamps and tighten/loosen nut **1** as required, recheck measurement. When correct bend tab to lock nut.



338630

Power Sideshift - Wear Pad Renewal

Inspection (1000 hours)

When the wear pads are worn to 6 mm (0.23 in) or below they should be replaced.

It is permissible to rotate the top wear pads 180° to prolong service life, provided the contact surface is more than 6 mm (0.23 in) thick.

Note: If rotating the wear pad the grease nipples will have to be swapped over.

Dismantling

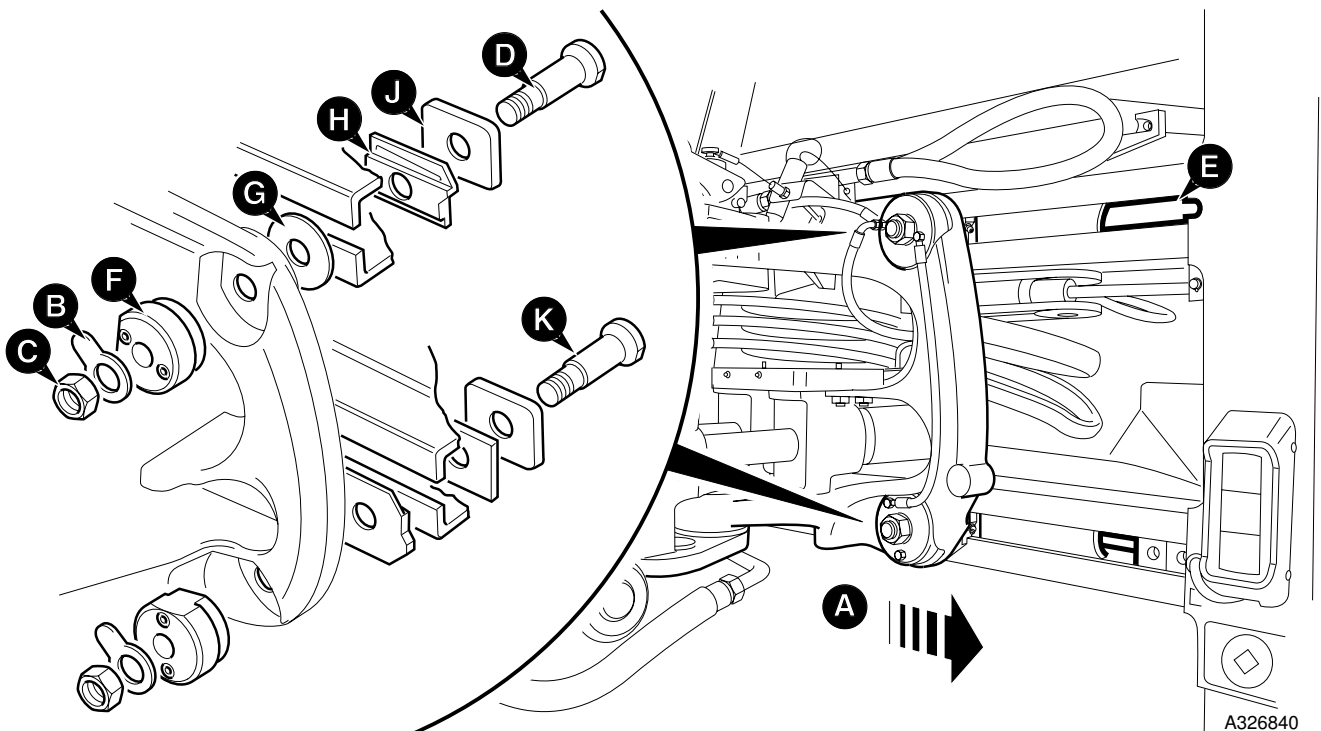
- 1 Park the machine on firm level ground, engage the parking brake and set the transmission to neutral. Lower the loader arms to the ground.
- 2 Set the carriage fully to end of travel **A**, shown in centre position for clarity.
- 3 Lower the bucket to take the weight off the kingpost.
- 4 Switch OFF the engine and remove the starter key, operate the control levers to vent residual hydraulic pressure.
- 5 Unlock top lock tab **B** and unscrew nut **C**.
- 6 Remove bolt **D** through the slot in the rail **E**.
- 7 Hydraulic clamp **F** and washer **G** should remain in position.
- 8 Remove plate **J** and wear pad **H**.

Assembly

- 9 Fit wear pad **H**, plate **J** and bolt **D**.
- 10 Fit new lock tab **B** and fit nut **C**.
- 11 Set the hydraclamp clearance as described in **Sideshift - Hydraclamp Clearance Setting**.
- 12 Repeat procedure steps 5 to 11 for the bottom clamp. The only difference on the bottom clamps is the wear pad is on the opposite side of the rail from the top clamp so bolt **K** need not be completely removed.

Note: If the wear pad is trapped between the rail and carriage, lower the bucket to relieve the load on the wear pad.

- 13 Lift the bucket and set the carriage to the opposite end of the travel, repeat the procedure for opposite side.
- 14 When all clamps have been assembled recheck the hydraclamp clearance of all clamps.



A326840

Power Sideshift - Chain Adjustment

The chain tension should be checked at the initial 100 hours service and every 500 hours.

Check and Adjust

- 1 Park the machine on firm level ground, engage the parking brake and set the transmission to neutral. Lower the loader arms to the ground.
- 2 Position the carriage centrally and rest the bucket on the ground, remove the starter key.
- 3 Check the chain tension which should be 5 to 10mm (0.19 to 0.39in) deflection **A** at the mid point. The tension should be equal for all chains.
- 4 If adjustment is required, slacken locknuts **C** and adjust on nuts **B** as required, tighten locknuts **C** on completion.
- 5 Repeat steps 3 and 4 for the opposite pair of chains.

Note: When there is no thread left for adjustment fit new chains.

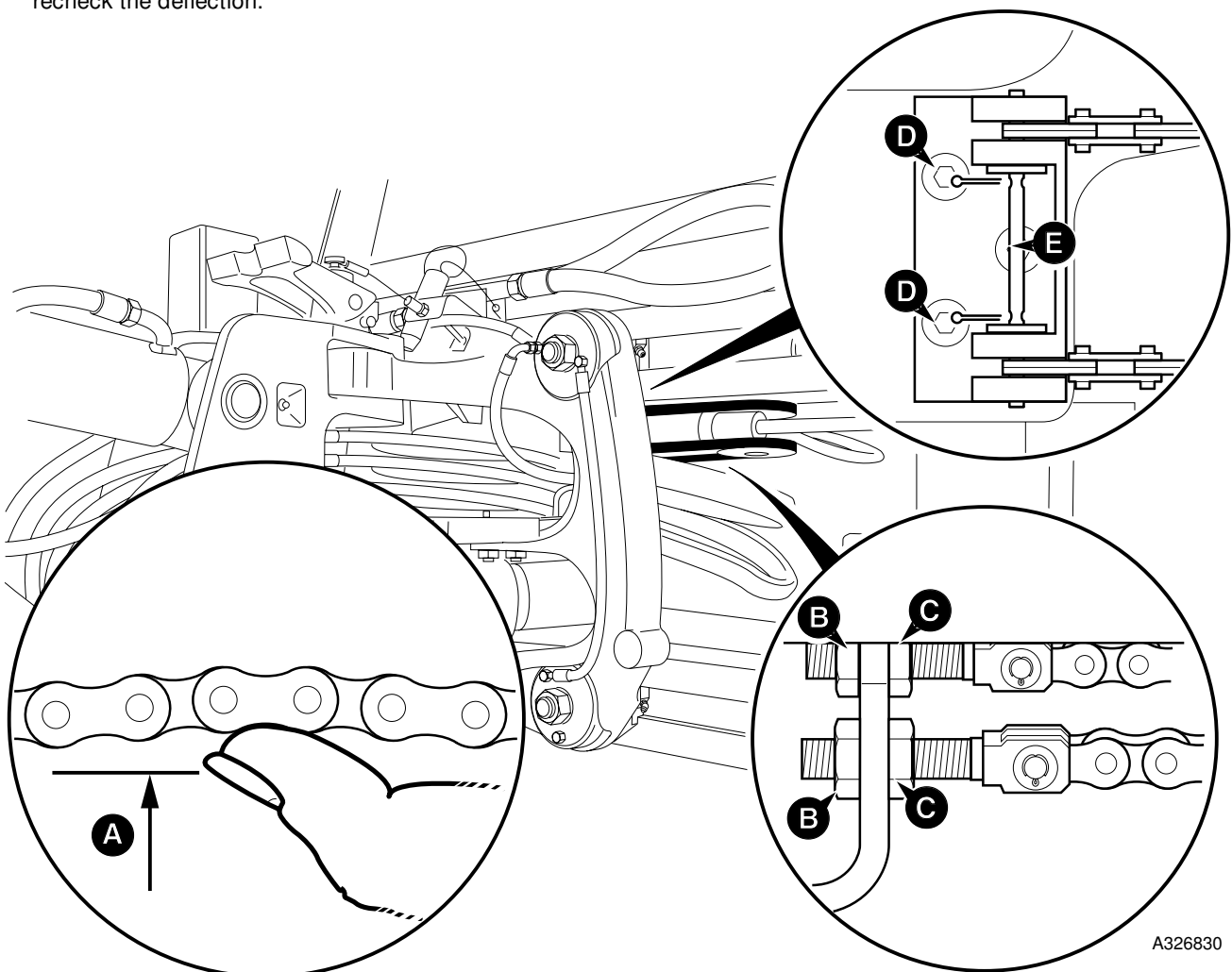
- 6 Operate the carriage side to side several times and recheck the deflection.

Removal

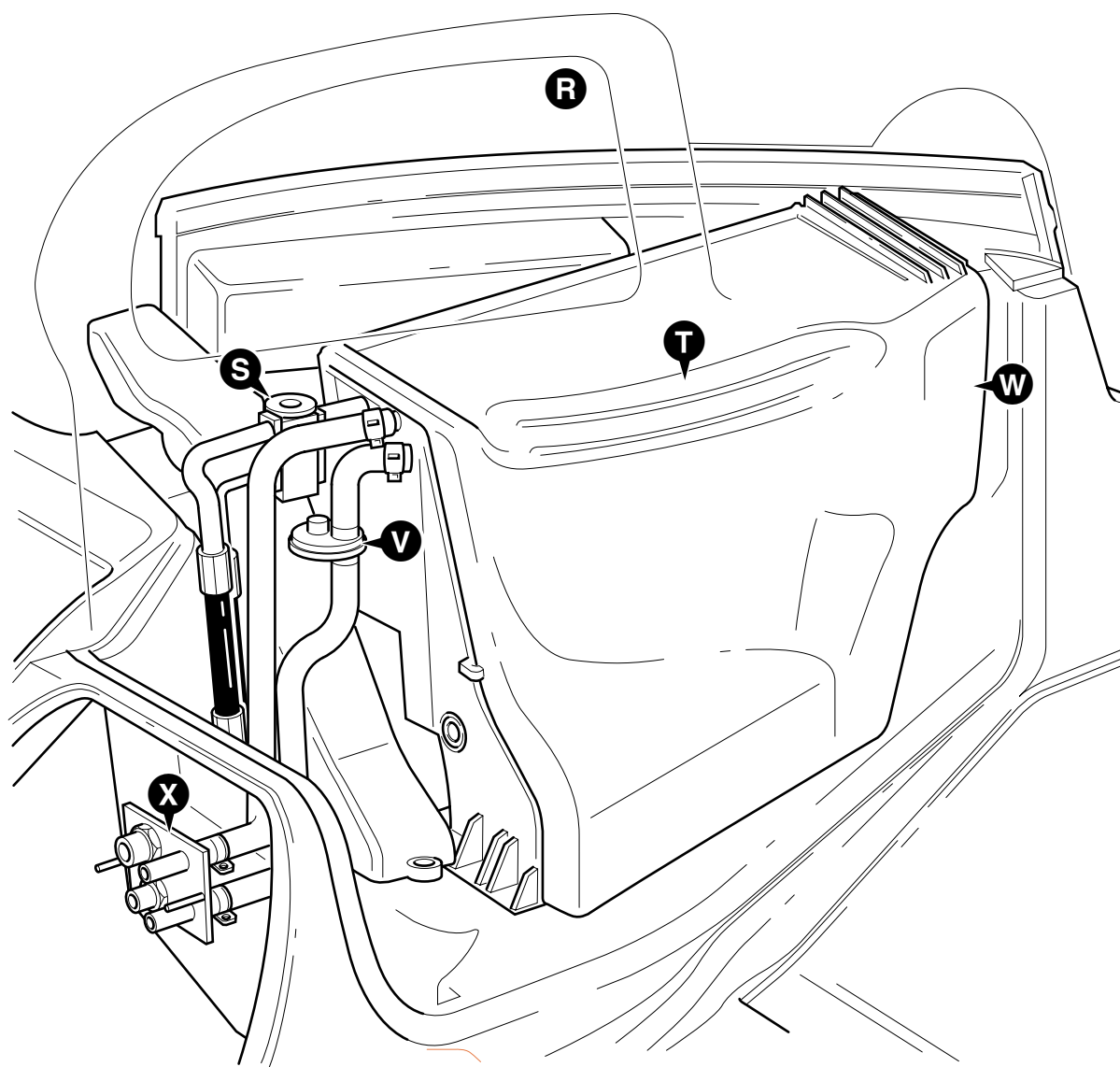
- 1 Park the machine on firm level ground, engage the parking brake and set the transmission to neutral. Lower the loader arms to the ground.
- 2 Position the carriage centrally and rest the bucket on the ground, remove the starter key.
- 3 Undo and remove nuts **B**.
- 4 Remove split pins **D** and pin **E**.
- 5 Withdraw chains from the machine.

Assembly

- 1 Thread the chains around the pulley and secure to the carriage with pin **E**, fit new split pins **D**.
- 2 Connect chain adjusters, tension chains as required, see **Check and Adjust**.



A326830



A401280

Component Key:

- R** A/C Controls
- S** Expansion Valve
- T** Re-circ Air Inlet
- V** Water Valve
- W** HVAC Unit
- X** Bulkhead Plate

HVAC/Air Conditioning Unit - Removal and Replacement

Note: Before removing the HVAC/Air Conditioning Unit, discharge the system. Refer to Service Procedures, Air Conditioning - Refrigerant Charging and Discharging.

The HVAC/air conditioning unit is located in the cab beneath the right hand side console. To access the unit the side console must first be removed. With the right hand side console removed as shown it is possible to gain access to the following:

- HVAC Unit Top Cover
- Binary Pressure Switch
- Water Valve

The HVAC unit top cover must also be removed to access the following components:

- Freeze Protection Thermostat
- Blower Unit
- Resistor
- Heat Exchangers (Heater and Evaporator)

Note: When removing components or hoses, retain any lubricant within the component/hose and replenish the system with the same amount of clean lubricant (PAG Oil).

Removal

Removal of the HVAC unit will require the assistance of a refrigeration engineer or suitably trained person since the refrigerant needs to be drained from the system.

- 1 Disconnect the battery.
- 2 Loosen and remove the side console screws and remove the side console.
- 3 Remove the spring clips (8 off) securing the HVAC unit top cover and carefully remove the HVAC top cover.

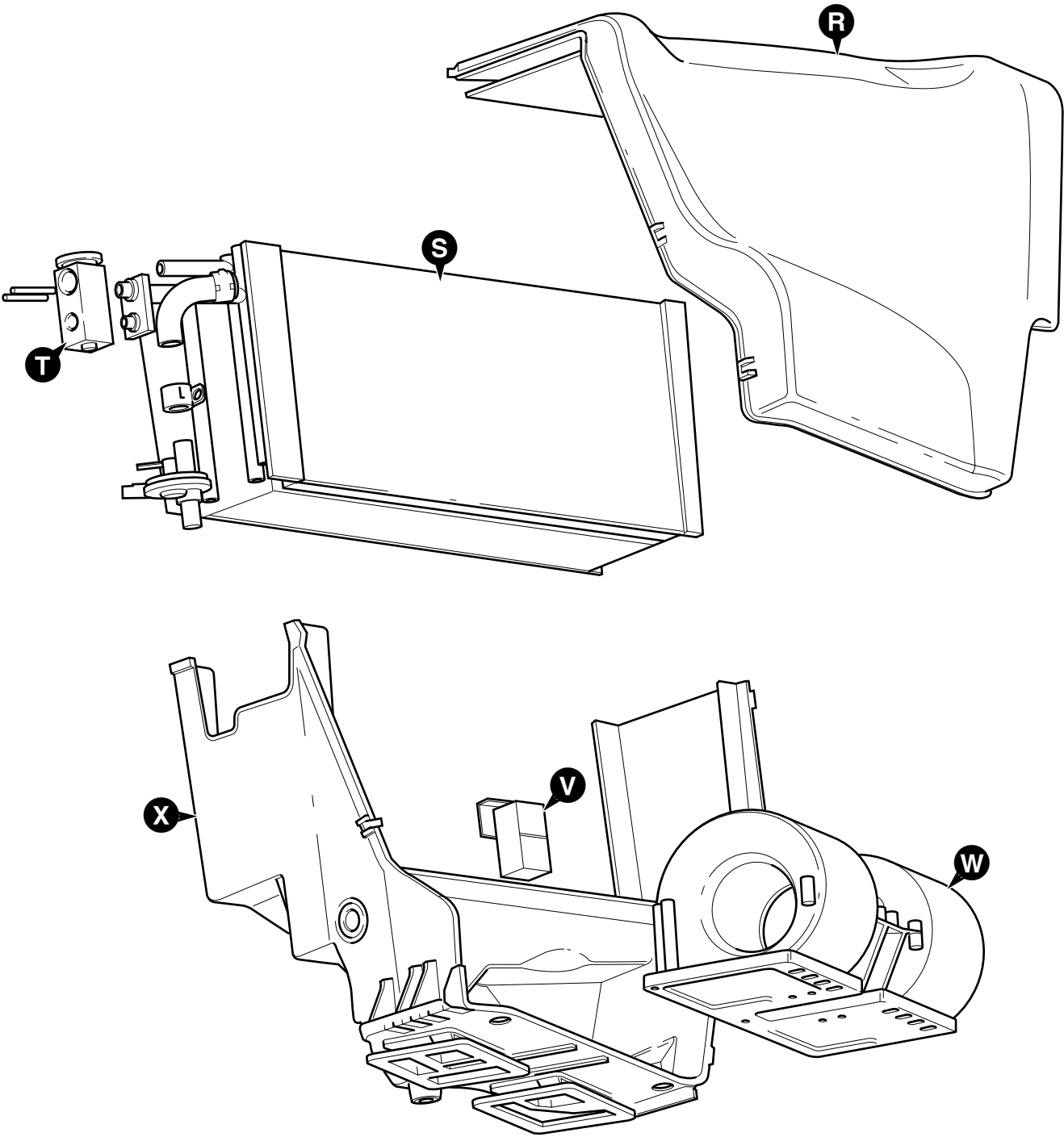
WARNING

The air conditioning system is a closed loop system and contains pressurised refrigerant. No part of the system must be disconnected except by a refrigeration engineer or suitably trained person. You can be severely frostbitten or injured by escaping refrigerant

4-3-4-1/2

- 4 Drain the refrigerant from the unit and remove all pipe work (refrigerant and air) which will prevent the unit from being withdrawn from the machine. Check around the top of unit, rear, bottom and right side.
- 5 Disconnect the pipe and electrical connections adjacent to the bulkhead plate **X**.
- 6 Remove the screws securing the HVAC unit housing to the cab and carefully withdraw the HVAC unit.

Replacement is the reverse of the removal procedure.



A401270

Component Key:

- R** HVAC Unit Top Cover
- S** Heat Exchanger (Heater and Evaporator)
- T** Expansion Valve
- V** Freeze Protection Thermostat
- W** Blower Unit
- X** HVAC Unit Housing

Blower Unit - Removal and Replacement

The blower **W** is located inside the HVAC/air conditioning unit and can be removed without having to remove the HVAC unit from the machine.

The only user-serviceable part is the resistor which determines the blower motor speed. Other faults, excluding wiring faults, necessitate the replacement of the blower unit complete.

Resistor replacement requires the removal of the blower unit as follows:

Removal

- 1 Disconnect the battery.
- 2 Gain access to the HVAC unit by removing the right hand side console and remove the HVAC unit top cover, refer to **HVAC/Air Conditioning Unit - Removal and Replacement** Steps 2 and 3.
- 3 Disconnect the electrical connections to the blower.
- 4 Remove the screws securing the blower unit to the HVAC unit housing.
- 5 Carefully withdraw the blower from the HVAC unit.
- 6 To remove the resistor, disconnect the electrical connections and unscrew the resistor.

Replacement is the reverse of the removal procedure.

Freeze Protection Thermostat - Removal and Replacement

The Thermostat **V** monitors the external temperature of the evaporator and is located inside the HVAC/air conditioning unit.

Removal

- 1 Disconnect the battery.
- 2 Gain access to the HVAC unit by removing the right hand side console and remove the HVAC unit top cover, refer to **HVAC/Air Conditioning Unit - Removal and Replacement** Steps 2 and 3.
- 3 Unclip the sensor wire from the evaporator and gently remove the wire from between the fins.
- 4 Disconnect the electrical connections to the thermostat.
- 5 Remove the screws securing the thermostat to the HVAC unit housing.

Replacement is the reverse of the removal procedure.

Evaporator Matrix - Removal and Replacement

Note: Before removing the Evaporator Matrix, discharge the system. Refer to Service Procedures, Air Conditioning - Refrigerant Charging and Discharging.

The evaporator matrix **S** is located inside the HVAC/air conditioning unit and can be removed without having to remove the HVAC unit from the machine.

Removal

Removal of the evaporator matrix will require the assistance of a refrigeration engineer or suitably trained person since the refrigerant needs to be drained from the system.

- 1 Disconnect the battery.
- 2 Gain access to the HVAC unit by removing the right hand side console and remove the HVAC unit top cover, refer to **HVAC/Air Conditioning Unit - Removal and Replacement** Steps 2 and 3.
- 3 Unclip the thermostat sensor wire from the evaporator and gently remove the wire from between the fins.

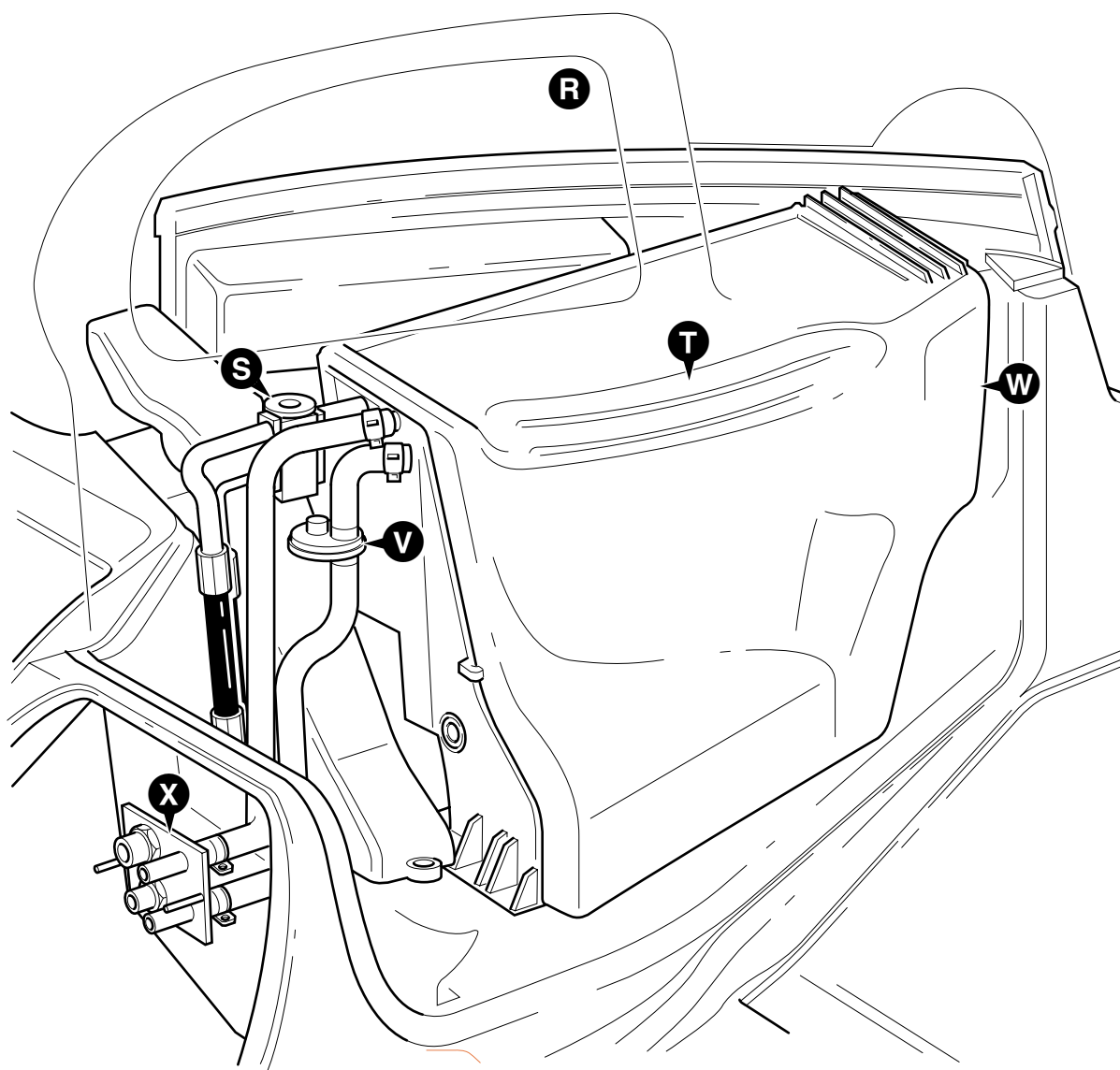
WARNING

The air conditioning system is a closed loop system and contains pressurised refrigerant. No part of the system must be disconnected except by a refrigeration engineer or suitably trained person. You can be severely frostbitten or injured by escaping refrigerant

4-3-4-1/2

- 4 Drain the refrigerant from the unit and remove all pipe work (refrigerant and air) which will prevent the unit from being withdrawn from the machine. Check around the top of unit, rear, bottom and right side.
- 5 Carefully lift the evaporator matrix complete with expansion valve **T** from the housing, bearing in mind that a certain amount of resistance will be met due to the stiction from the sealing putty.

Replacement is the reverse of the removal procedure.



A401280

Component Key:

- R** A/C Controls
- S** Expansion Valve
- T** Re-circ Air Inlet
- V** Water Valve
- W** HVAC Unit
- X** Bulkhead Plate

Binary Pressure Switch - Removal and Replacement

The pressure switch is located adjacent to the expansion valve **S** on the HVAC/air conditioning unit, beneath the right hand side console.

WARNING

Goggles and rubber gloves must be worn when pressure switches are removed or fitted. A small amount of refrigerant is released which can be harmful to the skin and eyes.

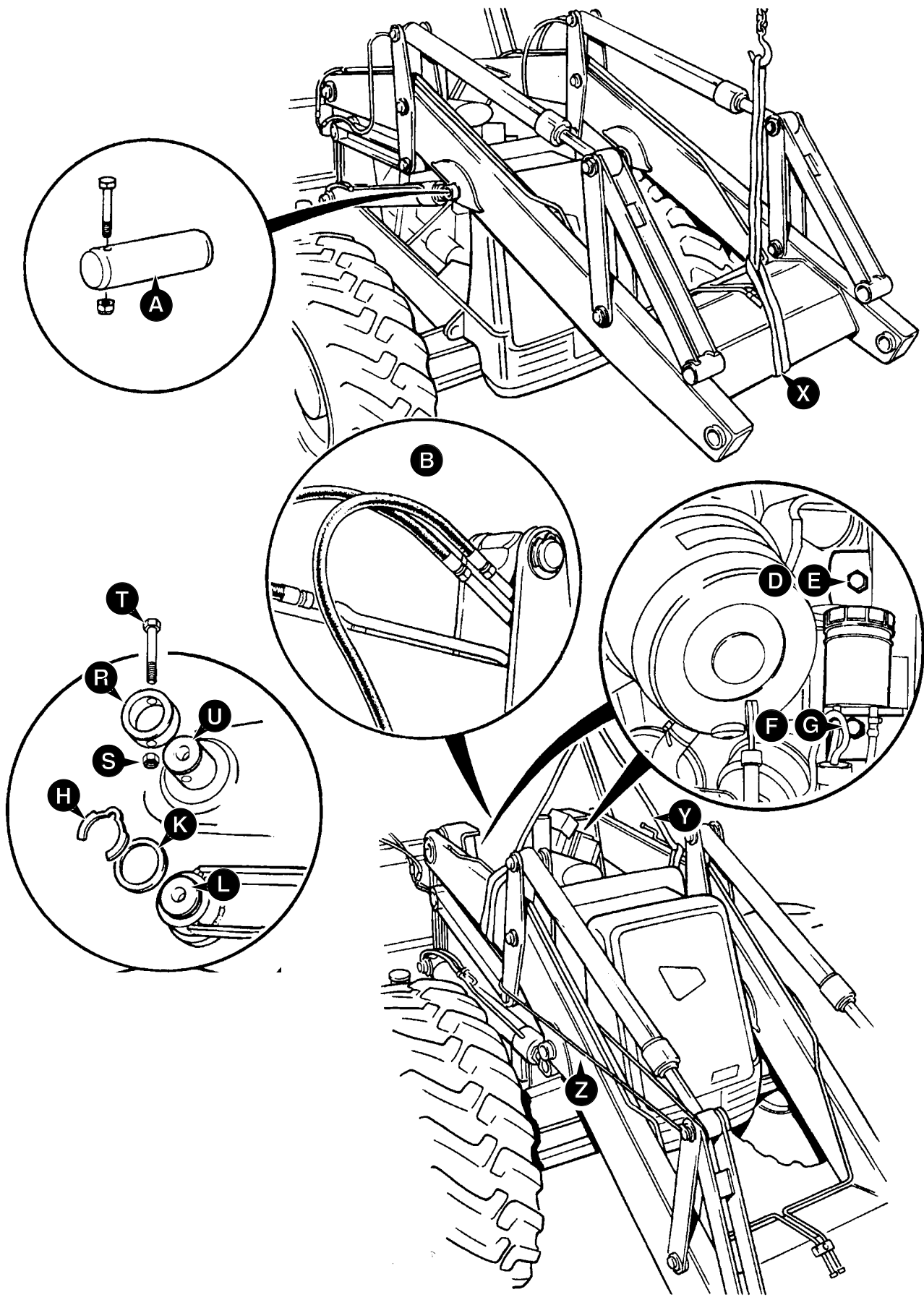
BF 1-10

Removal

- 1 Disconnect the battery.
- 2 Gain access to the HVAC unit by removing the right hand side console, refer to **HVAC/Air Conditioning Unit - Removal and Replacement** Step 2.
- 3 Disconnect the electrical connections and unscrew the pressure switch.

Replacement

- 1 Screw the pressure switch into the pressure switch port and torque tighten sufficiently to form a gas-tight seal.
- 2 Run the air conditioning and check the pressure switches for leaks. If any leaks are found, tighten the pressure switch further until the leaking stops.



cardiagn.com

Removal and Replacement

Removal

- 1 Park the machine on firm level ground. Engage the parking brake and set the transmission to neutral.
- 2 Remove loader end attachment (such as a shovel) if fitted. If the attachment is hydraulically operated, disconnect attachment hoses and plug/cap immediately. Vent residual hydraulic pressure prior to removing hoses by operating the control levers with the engine switched off.

WARNING

DO NOT work under raised loader arms unless they are adequately supported by stands and/or slings.

BF 3-1

- 3 Remove the engine panels, refer to Section 3 **Routine Maintenance - Engine Panels**.
- 4 Raise the loader arms to give access to the lift ram pivot pins **A**.
- 5 Sling the loader arms as shown at **X**. Make sure that the slings are taut and therefore holding the weight of the loader arms.
- 6 Switch off the engine and vent residual hydraulic pressure from the loader end by operating the loader controls back and forth several times.
- 7 Remove the lift ram pivot pins **A**.

Note: Care must be taken when removing the lift ram pivot pin, once the pin is removed the ram will drop. Either hold the ram using a sling or have a second person hold the ram before removing the pin.

- 8 Lower the loader arms to the ground using the slings, it may be necessary to retract the lift rams to enable the loader arms to rest fully on the ground. Make sure the lift rams do not foul when retracted.
- 9 Make sure residual hydraulic pressure has been vented. Disconnect the shovel ram and auxiliary (if fitted) hoses, shown at **B**. Plug and cap the hoses immediately.
- 10 Disconnect the electrical connections (not shown) to the loader shovel reset switch (if fitted).
- 11 Remove pivot pin retaining bolts **D**, **E**, **F** and **G**.
- 12 Sling the loader arms as shown at **Y**. Make sure that the sling is wrapped around the loader arms only and not the level links.
- 13 Remove klipring **H** and shim **K**.

WARNING

The loader arm interlevers are potentially dangerous, when pivoting about their centre they form a 'scissor' point with the loader arm. Make sure the interlevers are securely blocked when working in the loader arm area.

BF 2-1

- 14 Secure the interlever lever linkage as shown at **Z**, otherwise with level link pivot pin **L** removed, the interlever linkage could pivot about its centre and cause injury and/or damage.
- 15 Remove pivot pin **L** (use slide hammer kit, service tool 993/68100).
- 16 Repeat steps **13** to **15** for the opposite level link pivot pin.
- 17 Remove bolt **T** and retaining ring **R**.
- 18 Remove pivot pin **U** (use slide hammer kit, service tool 993/68100).
- 19 Repeat steps **17** and **18** for the opposite loader arm pivot pin.
- 20 When all four pivot pins have been removed, carefully reverse the machine clear of the loader arms

Replacement

Replacement is a reversal of the removal sequence.

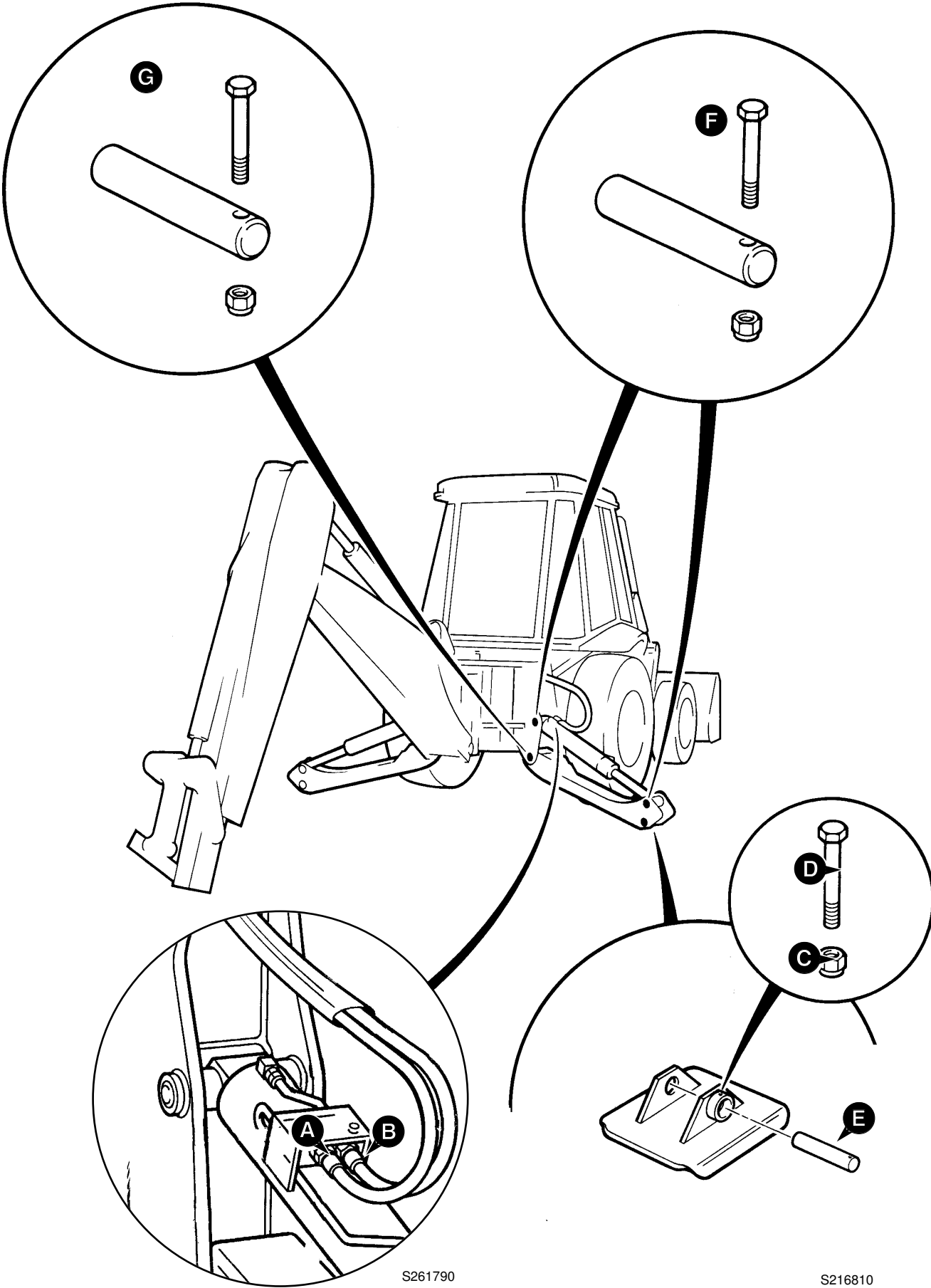
Fit pivot pins with the extraction hole on the outside of the machine.

Check operation of loader shovel reset switch (if fitted).

Apply grease to all mainframe bores.

Apply rust inhibiting oil to all pivot pins.

If fitting new liner bearings, assemble with a close fitting shouldered mandrel to ensure minimum ovality.



cardiagn.com

Removal and Replacement - (Centremount Machines)

Removal

- 1 Park the machine on firm level ground, engage the parking brake and set the transmission to neutral. Lower the backhoe and loader end to the ground and stop the engine.
- 2 Lower the stabiliser legs to the ground.

DANGER

Hydraulic Pressure

Hydraulic fluid at system pressure can injure you. Before disconnecting or connecting hydraulic hoses, stop the engine and operate the controls to release pressure trapped in the hoses. Make sure the engine cannot be started while the hoses are open.

INT-3-1-11/1

- 3 Make sure the engine is switched off, vent residual hydraulic pressure by moving the backhoe and stabiliser control levers back and forth.

Note: If a check valve is fitted on the ram, the system will not vent. Extreme caution must be used when releasing hydraulic connections - release the connections one turn and allow the pressure to dissipate.

- 4 Remove the stabiliser ram:
 - a Carefully disconnect hydraulic hoses **A** and **B** from the stabiliser hydraulic ram, label the hoses before removing (as an aid to assembly). Release the connections slowly.
 - b If a stabiliser foot is fitted, remove nut **C** and retaining bolt **D**. Drive out the foot retaining pin **E**.

CAUTION

The ram is heavy. It is recommended that the ram is removed with the assistance of a sling and suitable lifting appliance.

BF 2-4

- c Wrap a suitable sling around the stabiliser ram, make sure that the weight of the ram is supported by the sling.
- d Remove the ram pivot pin retaining nut and bolt, drive out the ram pivot pin as shown at **F**.
- e Remove the stabiliser ram.

- 5 Remove the stabiliser leg:

CAUTION

The stabiliser leg is heavy. It is recommended that the stabiliser leg is removed with the assistance of a sling and suitable lifting appliance.

BF 2-6

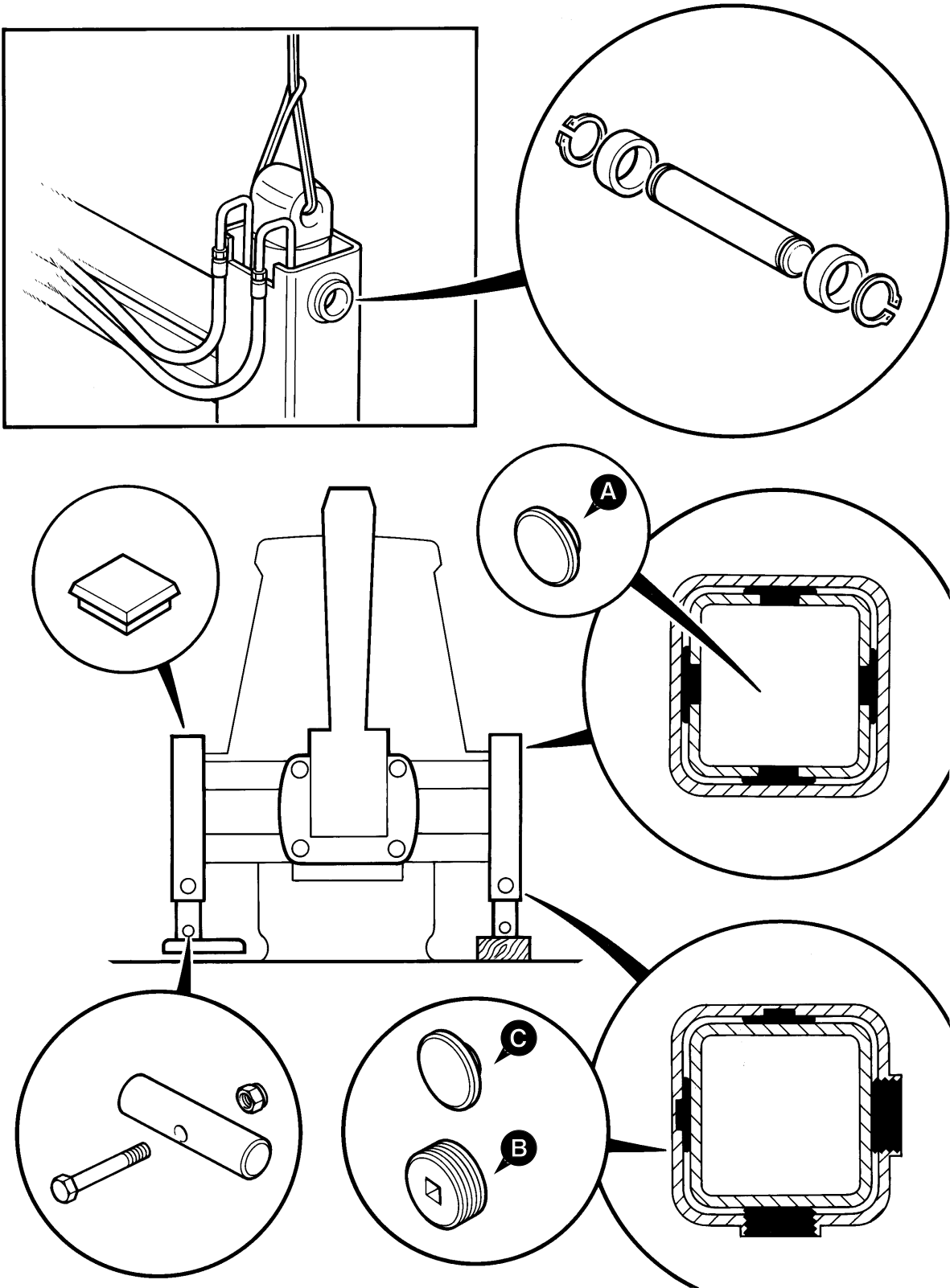
- a Wrap a suitable sling around the stabiliser leg, make sure that the weight of the leg is supported by the sling.
- b Remove the stabiliser leg pivot pin retaining nut and bolt, drive out the stabiliser leg pivot pin, as shown at **G**.
- c Remove the stabiliser leg.

Replacement

Replacement is a reversal of the removal sequence.

Use suitable lifting appliances to locate the stabiliser ram and the stabiliser leg.

After replacing or fitting the stabiliser leg, connect the hydraulic pipes, make sure that the ram and leg operate freely and do not foul.



S271850

Removal and Replacement - (Sideshift Machines)

Removal

- 1 Park the machine on firm level ground. Engage the parking brake and set the transmission to neutral.
- 2 Lower the loader shovel to the ground.
- 3 Make sure that the backhoe assembly is set central to the mainframe as shown. If necessary 'sideshift' the backhoe into a central position.
- 4 Remove the stabiliser foot and ram, refer to Section E **Hydraulic Rams, Removal and Replacement - Stabiliser Ram**.
- 5 Remove the inner leg:
 - a Locate a suitable jack underneath the inner leg.
 - b Use the jack to lift the inner leg until the top wear pads **A** protrude from the top of the outer leg section.
 - c Remove the wear pads and attach suitable lifting gear through the wear pad locating holes.
 - d Use suitable lifting equipment, lift the inner leg clear.

Replacement

Replacement is a reversal of the removal sequence.

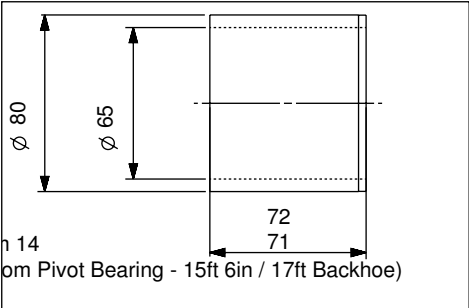
Select suitable size upper pads **A** to achieve a maximum permissible float of 1mm (0.039 in.).

Make sure that the bottom pads **C** are held in position before guiding the inner leg into position. If the lower pads are not secured then the inner leg could dislodge the pads during assembly.

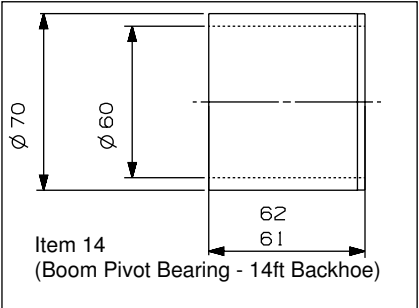
When the inner leg is in position adjust the bottom pads, refer to Section 3 **Stabiliser Legs - Wear Pad Adjustment**.

Apply a grease such as JCB slew grease (part number 4003/1601) to the threads of pad **B**.

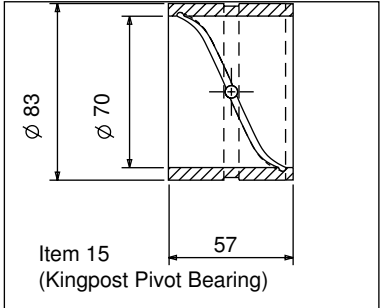
Removal and Replacement



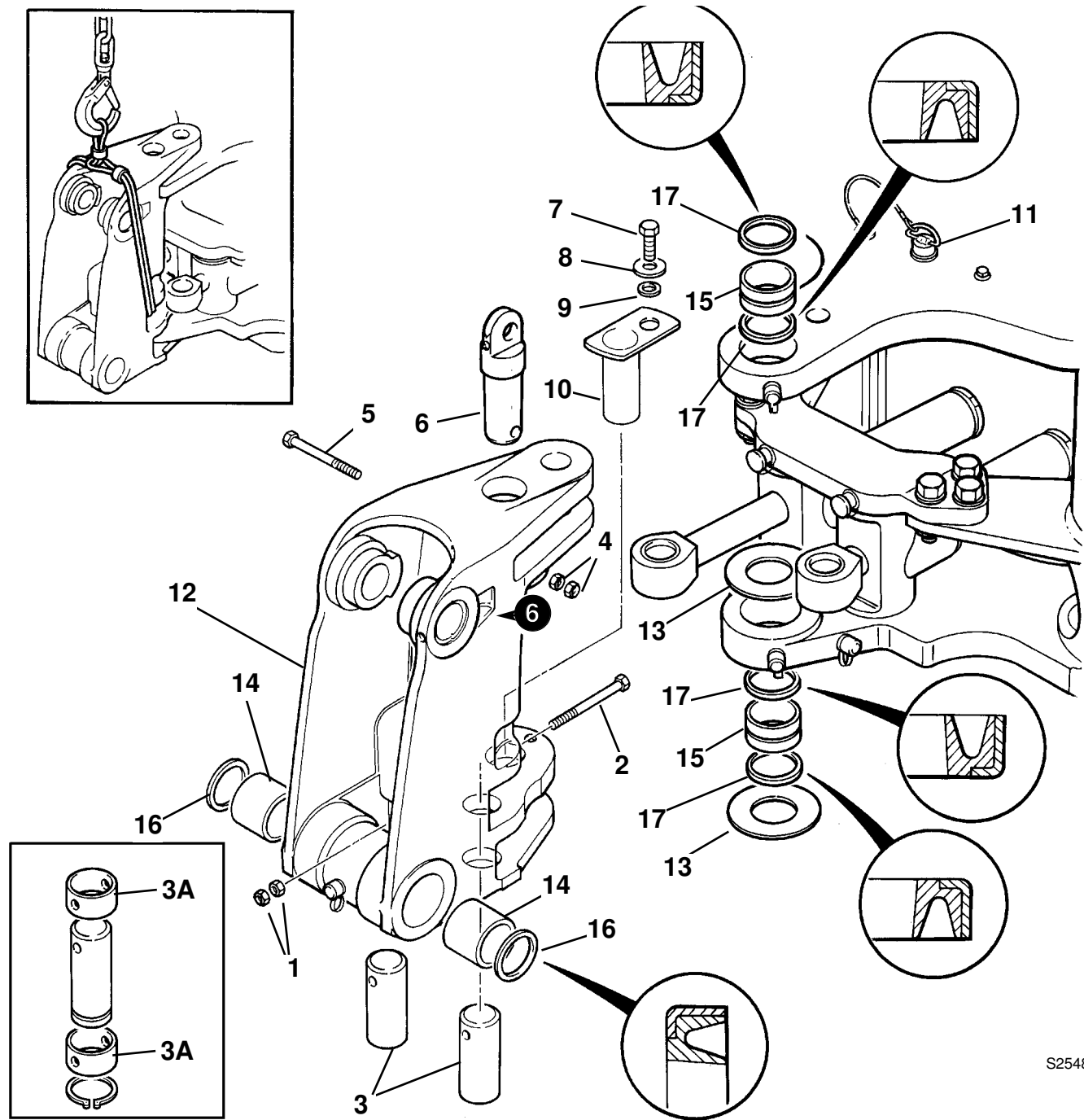
A261800



A252870



A252880



S254893

Removal and Replacement

Removal

- 1 Slew the kingpost to the centre and remove the boom and dipper.

WARNING

Hydraulic fluid at system pressure can injure you. Before disconnecting or connecting hydraulic hoses, stop the engine and operate the controls to release pressure trapped in the hoses. Make sure the engine cannot be started while the hoses are open.

INT-3-1-11/1

- 2 Make sure that the slew lock pivot pin **11** is in its stowage position (i.e. not fitted in the 'slew lock' position).
- 3 Working from the base up, disconnect the backhoe hydraulic hoses, before disconnecting the hoses make sure that they are labelled (to assist with reassembly).
- 4 Plug and cap all open hydraulic connections to prevent ingress of dirt and loss of hydraulic fluid.
- 5 Remove thin nuts **1** (2 off per pivot pin) and remove pivot pin retaining bolt **2** (2 off).
- 6 Remove the slew ram (eye end) pivot pins **3** (2 off) and bearing liners **3A**.
- 7 Attach suitable lifting straps to the kingpost assembly. Note that the weight of the kingpost casting is approximately 130 kg (287 lbs).
- 8 Remove the boom lock assembly (see Boom Lock Removal and Replacement in Controls, section D).
- 9 Remove thin nuts **4** (2 off) and remove retaining bolt **5**.
- 10 Remove the kingpost top pivot pin **6**.
- 11 Remove bolt **7**, washer **8**, and spacer **9**.
- 12 Remove the kingpost bottom pivot pin **10**.
- 13 Remove the kingpost casting **12** from the rear frame and thrust washers **13**.

Inspection

Inspect the nickel bronze liner bearings **14** and **15** for signs of damage, wear, scores or nicks etc. Use a suitable mandrel (manufactured locally) to facilitate removal of the liner bearings.

To ensure the drift is manufactured to the correct size, the liner bearing dimensions are shown on the illustration. Note that the dimensions are NOMINAL figures only and must not be used to manufacture the liner bearings.

Replacement

Replacement is generally a reversal of the removal procedures, however note the following:

To assist with the identification of 15ft 6in and 17ft centremount kingposts the number **6** is stamped on the kingpost to identify 60mm diameter bores.

Check for and remove any burrs and sharp edges on both housing bore, bearing and pivot pin to minimise assembly damage.

If necessary, use oil or suitable lubricant to facilitate pressing-in bearing - to minimise scoring of mating face.

Bearings **14** and **15** have 'lead-in' diameters (noticeable with a slight step), always install the smaller diameter first into the pivot bore.

Thrust washers **13** come in different sizes to allow for variations of castings.

Make sure that the boom base liner bearings **14** are fully engaged in the boom base pivot bores. There must be a recess of 5mm (3/16 inch) to allow for installation of the seals **16**.

If fitting new liner bearings, assemble with a close fitting shouldered mandrel. Refer to liner bearing sizes on the illustration (nominal figures given).

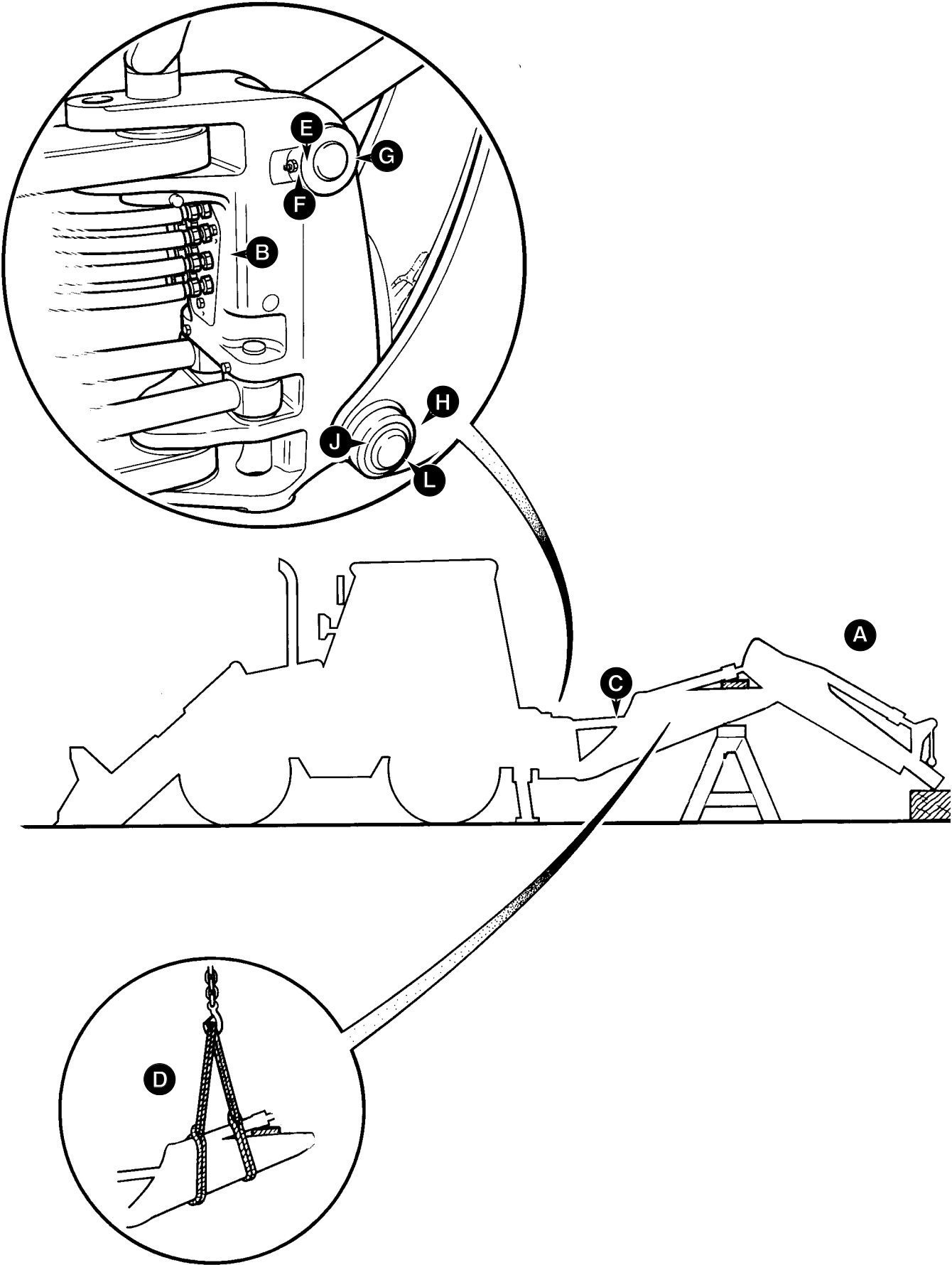
Make sure that the liner bearings **15** are fully engaged in the kingpost pivot bores. There must be a recess of 6mm (1/4 inch) to allow for installation of the seals **17**.

If a new kingpost casting has been installed, the boom lock may need resetting, refer to the boom lock removal and replacement procedures.

Seals **16** and **17** are lip seals, on reassembly make sure that the seal lips face outward (shown in insets on the kingpost pivot).

Make sure that thin lock nuts, items **1** and **4** are 'just' free when locked into position.

Make sure that all pivot bores and pivot pins are clean and greased when assembling. When fully assembled, apply grease at each grease nipple before operating the machine.



Boom - Removal and Replacement

Removal

The procedures describe the removal of the boom with the boom and dipper rams still installed. If required, these items can be removed separately before removing the boom, refer to the appropriate removal and replacement procedure.

- 1 Remove the backhoe bucket and place the backhoe in the position shown at **A**.
- 2 Lower the stabilisers.
- 3 Stop the engine and disconnect the battery (to prevent the engine being started).
- 4 Operate the backhoe control levers back and forth several times to release pressure trapped in the hydraulic hoses.

DANGER

Hydraulic Pressure

Hydraulic fluid at system pressure can injure you. Before disconnecting or connecting hydraulic hoses, stop the engine and operate the controls to release pressure trapped in the hoses. Make sure the engine cannot be started while the hoses are open.

INT-3-1-11/1

- 5 Disconnect the hydraulic hoses from the bulkhead plate **B**. Always label hydraulic hoses before disconnecting them, this will ensure that they are correctly reconnected. Plug and cap all hose open ends to prevent ingress of dirt and loss of hydraulic fluid.
- 6 Remove the dipper, see **Dipper - Removal and Replacement**.
- 7 Wrap a sling around the boom as shown at **D**. Make sure the weight of the boom is held by the sling before removing pivot pins etc.
- 8 Place a suitable support underneath the boom ram **C**.
- 9 Remove two thin nuts **E**, bolt **F** and pivot pin **G**.
- 10 Remove heavy duty circlip **H**, spacers **J** (one fitted each side) and pivot pin **L**. Mark the spacers so that they can be replaced in the same positions.
- 11 Hoist the boom clear of the kingpost assembly.

Replacement

WARNING

Hydraulic Fluid

Fine jets of hydraulic fluid at high pressure can penetrate the skin. Do not use your fingers to check for hydraulic fluid leaks. Do not put your face close to suspected leaks. Hold a piece of cardboard close to suspected leaks and then inspect the cardboard for signs of hydraulic fluid. If hydraulic fluid penetrates your skin, get medical help immediately.

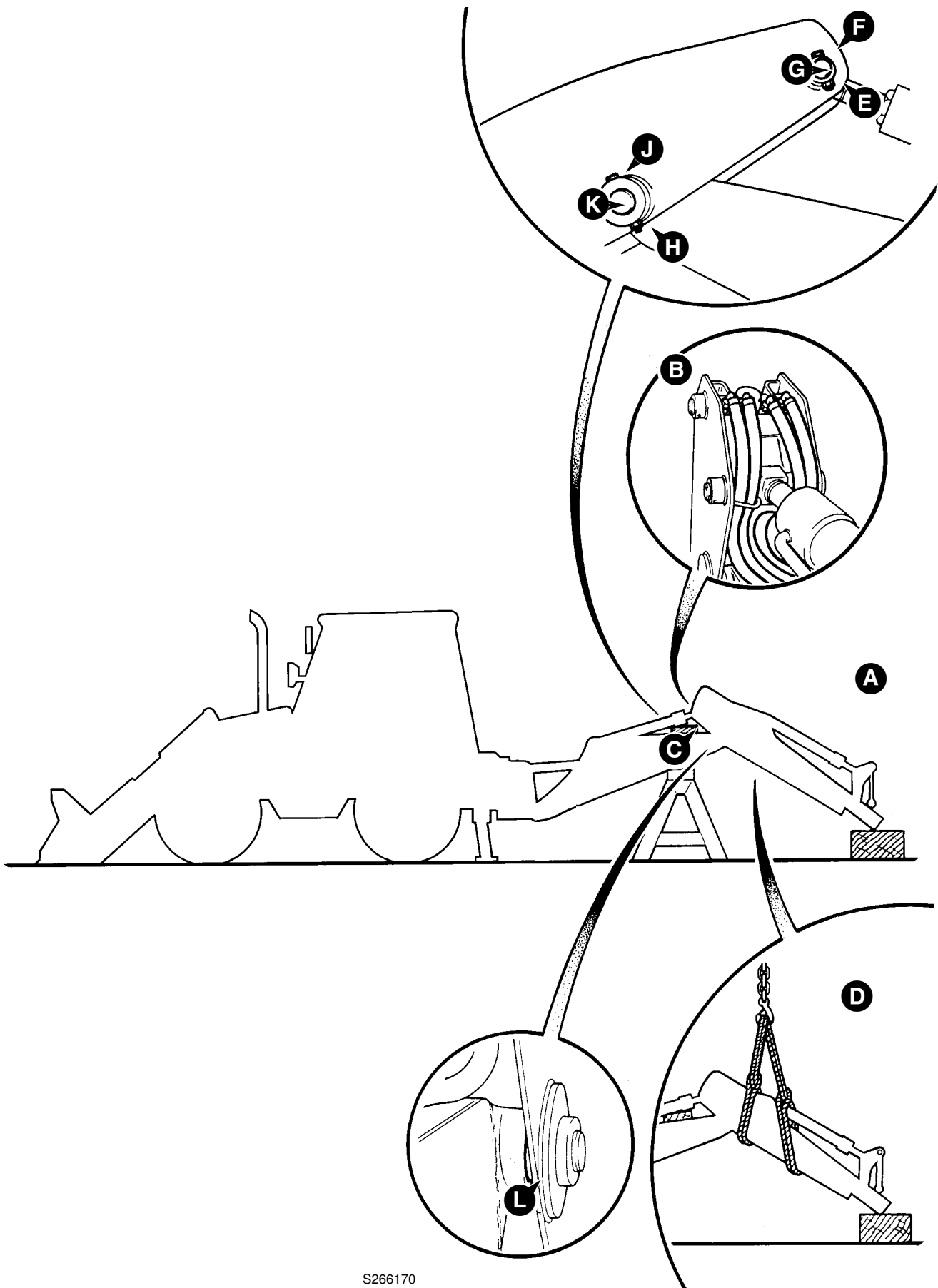
INT-3-1-10/1

Replacement is generally a reversal of the installation procedure.

The boom pivot pin **G** must be retained using two M12 thin nuts. Fit the first thin nut with zero torque, fit the second thin nut and torque to 98Nm (72 lbf ft).

When fitting the boom to the kingpost assembly, make sure that spacers **J** are refitted in their original positions.

Replace all pivot pin seals as required.



S266170

Dipper - Removal and Replacement

Removal

The procedures describe the removal of the dipper with the extradig (if fitted) and the bucket ram still installed. If required, these items can be removed separately before removing the dipper, refer to the appropriate removal and replacement procedure.

- 1 Remove the backhoe bucket and place the backhoe in the position shown at **A**.
- 2 Lower the stabilisers.
- 3 Stop the engine and disconnect the battery (to prevent the engine being started).
- 4 Operate the backhoe control levers back and forth several times to release pressure trapped in the hydraulic hoses.

DANGER

Hydraulic Pressure

Hydraulic fluid at system pressure can injure you. Before disconnecting or connecting hydraulic hoses, stop the engine and operate the controls to release pressure trapped in the hoses. Make sure the engine cannot be started while the hoses are open.

INT-3-1-11/1

- 5 Disconnect the hydraulic hoses, as shown at **B**. Always label hydraulic hoses before disconnecting them, this will ensure that they are correctly reconnected. Plug and cap all hose open ends to prevent ingress of dirt and loss of hydraulic fluid.
- 6 Place a suitable support underneath the dipper ram as shown at **C**.
- 7 Wrap a sling around the dipper as shown at **D**. Make sure the weight of the dipper is held by the sling before removing pivot pins etc.
- 8 Remove nut **E**, bolt **F** and pivot pin **G**.
- 9 Remove two thin nuts **H**, bolt **J** and pivot pin **K**.

Note: It is important to use two thin nuts, this arrangement allows the pivot pin retaining bolt to be secured without inducing a lateral tension.

- 10 Hoist the dipper clear of the boom.

Replacement

WARNING

Hydraulic Fluid

Fine jets of hydraulic fluid at high pressure can penetrate the skin. Do not use your fingers to check for hydraulic fluid leaks. Do not put your face close to suspected leaks. Hold a piece of cardboard close to suspected leaks and then inspect the cardboard for signs of hydraulic fluid. If hydraulic fluid penetrates your skin, get medical help immediately.

INT-3-1-10/1

Replacement is generally a reversal of the installation procedure.

The boom to dipper pivot pin **K** must be retained using two M12 thin nuts. Fit the first thin nut with zero torque, fit the second thin nut and torque to 98Nm (72 lbf ft).

When fitting the dipper to the boom, make sure that shim, item **L** is installed as shown.

Replace all pivot pin seals as required.

Removal and Replacement

Removal

⚠ WARNING

Make the machine safe before working underneath it. Park the machine on level ground, lower the arms. Apply the parking brake, put the transmission in neutral and stop the engine. Chock both sides of all four wheels.

Disconnect the battery, to prevent the engine being started while you are beneath the machine.

GEN-1-2

- 1 Operate the control levers to vent residual pressure.
- 2 Remove the filler cap and unscrew plug **B** to drain the tank.
- 3 Disconnect and plug the hydraulic hoses **D** from the rear of the tank.

* **Note:** Some machine variants may have different return hose configurations at the tank to those illustrated. Be sure to disconnect all hoses.

- * 4 Loosen the 2 clips **F** on the suction hose **G**. Pull off the hose at the tank.
- 5 Support the tank, then unscrew mounting bolts **E** and lift tank away from the machine.

Replacement

Replace the tank by reversing the removal procedure.

If a new tank is being fitted, remove the tool box from the old tank and fit to the new tank.

Apply JCB Threadlocker and Sealer to drain plug **B**.

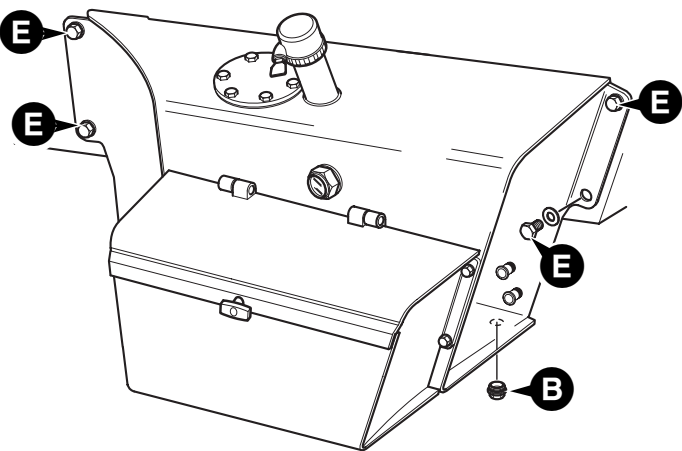
- * When refitting the suction hose **G** make sure it is correctly fitted and phased on the tank spigot. There must be at least 12 mm (0.5 in) clearance between the hose and the gearbox casing. Phase the 2 clips **F** 180° apart.

Refill with clean hydraulic oil as specified, refer to Section 3 **Fluids, Lubricants, Capacities and Specifications**.

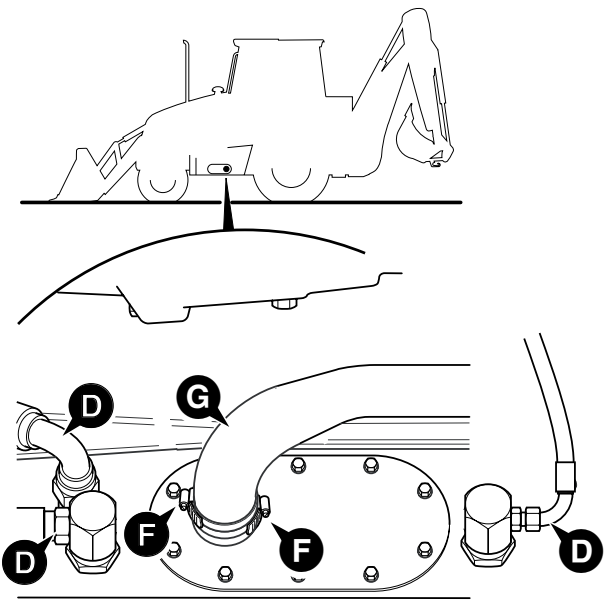
- * Operate the machine until the hydraulic oil reaches operating temperature (50 °C, 122 °F). Stop the engine and check for leaks.

Torque Setting

Item	Nm	lbf ft	kgf m
B	100	73.76	10.20
* F	5	4	0.5



A401540



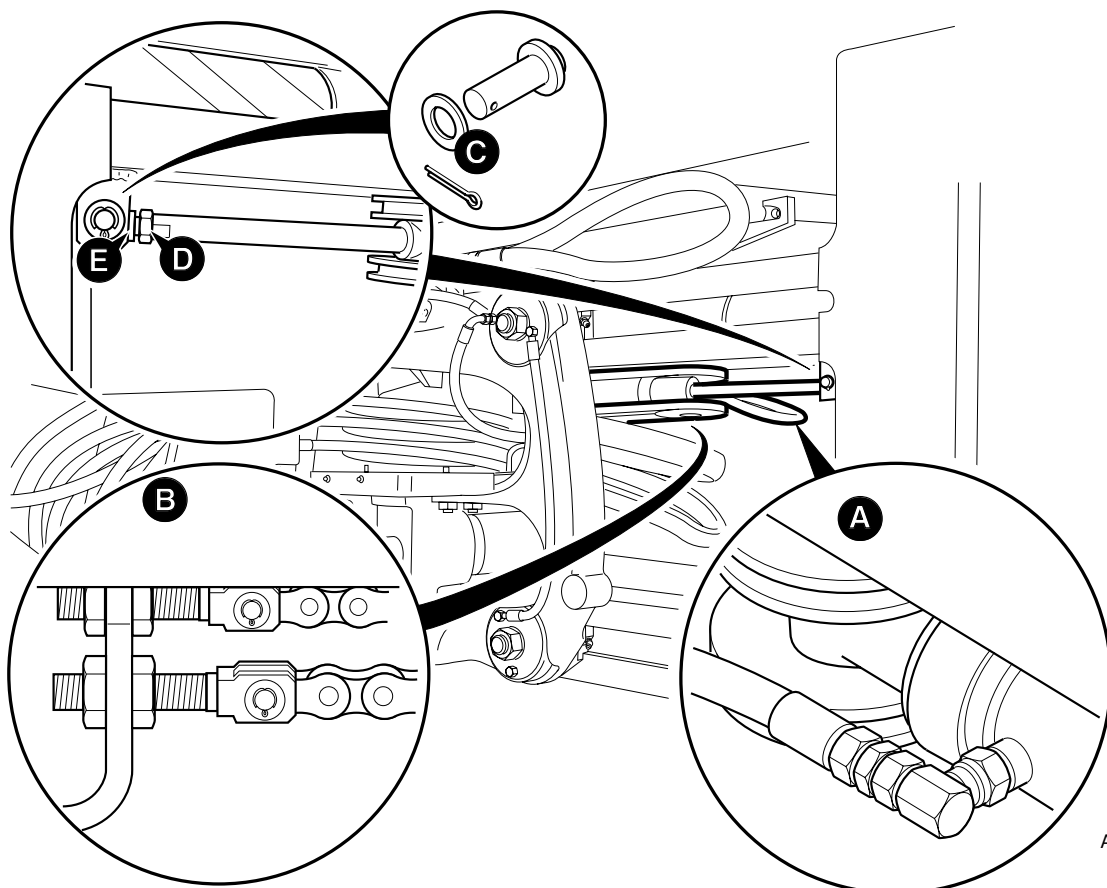
Removal and Replacement

Removal

- 1 Park the machine on firm level ground, engage the parking brake and set the transmission to neutral. Lower the loader arms to the ground.
- 2 Position the carriage in the central protruding travel position at 150 mm (6 in) from end of the rail, rest the bucket on the ground and remove the starter key.
- 3 Operate control levers to vent hydraulic pressure.
- 4 Disconnect hydraulic hoses **A** and plug.
- 5 Disconnect all four chains at adjusters **B** and disengage chains from ram pulleys.
- 6 Remove pin **C** from one end and support the ram.
- 7 Remove pin **C** from opposite end, withdraw ram.

Replacement

- 1 Locate the ram at one end with pin **C**. Adjust the ram eye end so the the opposite end of the ram aligns with mounting bracket.
- 2 Secure the opposite end of the ram in position with pin **C**.
- 3 With a spanner on the rod end flats **D** adjust the rod so that the ram eye end engagement is equal at each end of the ram. Lock eye ends in position with nut **E**.
- 4 Reconnect the hydraulic hoses.
- 5 Locate the chains around the applicable ram pulleys. Reconnect chains and adjust as required, refer to **Service Procedures, Power Sideshift - Chain Adjustment**.



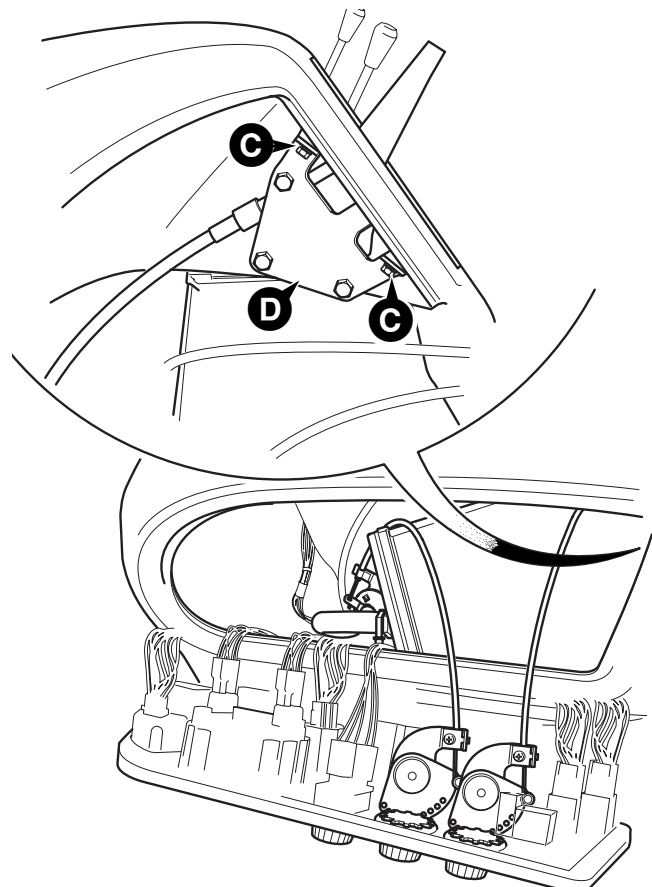
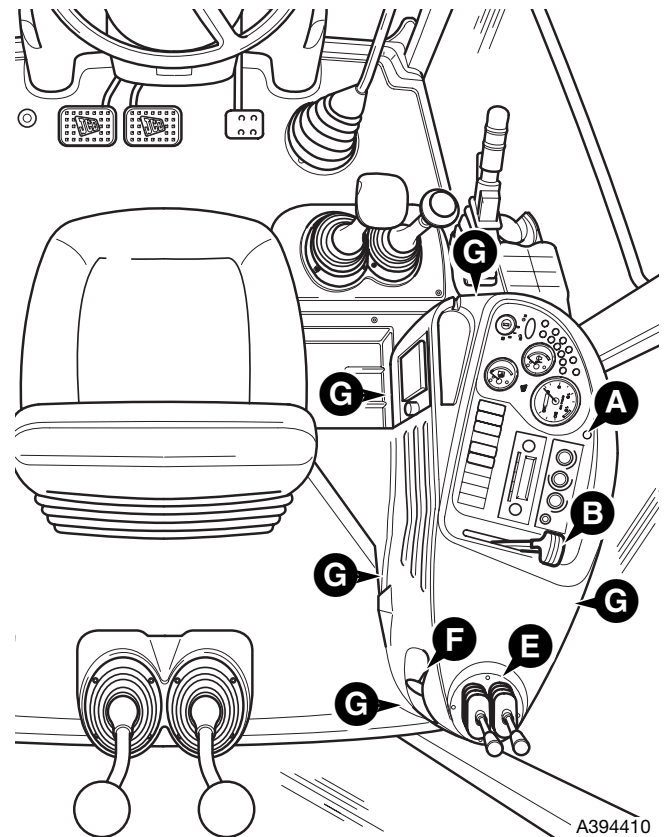
A326850

Removal and Replacement

Side Console

Removal

- 1 Park the machine on firm level ground, apply the parking brake. Lower the loader arms and excavator to the ground, switch OFF the engine and remove the starter key.
- 2 Disconnect the battery.
- 3 Working in the cab, remove the fixing **A** at the top of the instrument panel and carefully lift the panel forward to reveal the connections at the back as shown.
- 4 Disconnect the electrical connectors and heater controls cables at the rear of the instrument panel, then remove the instrument panel assembly clear of the side console. Label the connectors and controls cables before disconnecting to ensure correct replacement.
- 5 Remove the hand throttle lever knob **B**, remove the screws **C** from the hand throttle lever and mounting bracket assembly **D** inside the side console as shown. Withdraw the handle through the slot in the panel.
- 6 Remove the screws from around the base of the stabiliser control levers **E**, carefully withdraw the lever assembly from the side console and disconnect the control cables from the underside. Label each control cable before disconnecting to ensure correct replacement.
- 7 Unscrew the knob and lock nut from the boom lock control **F**.
- 8 Remove the fixings **G** (5 off) securing the side console panel at positions shown. Carefully lift up the rear corner of the side panel over the boom lock control outer sleeve, and then lift the side panel clear.



Replacement

Replacement is the reverse of the removal sequence.

Take care when removing/replacing the console panel to ensure that harnesses do not become snagged and that no other connections have been disturbed.

After re-fitting, operate the side console controls and check they all function correctly.

Removal and Replacement

Front/Steering Console

Removal

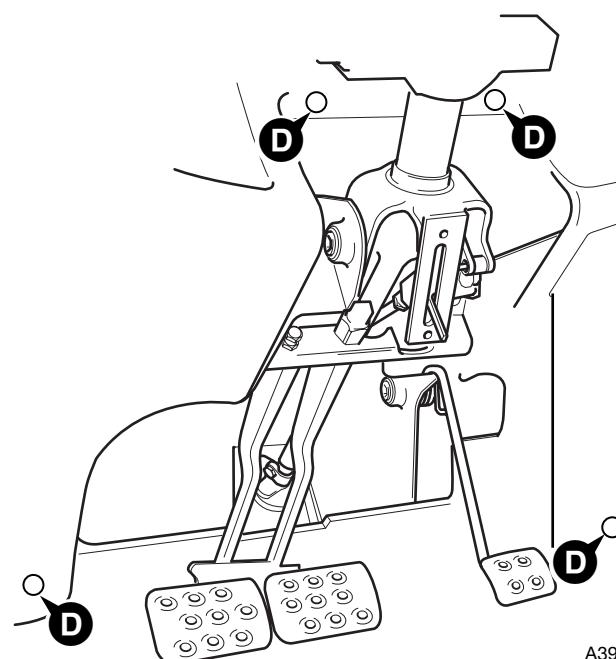
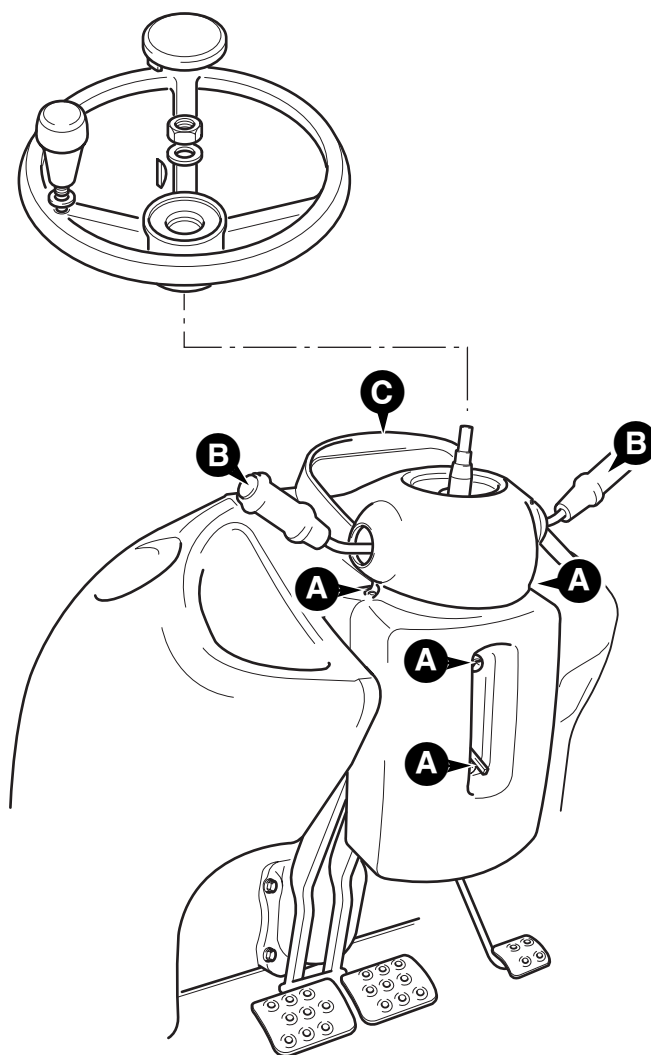
- 1 Park the machine on firm level ground, apply the parking brake. Lower the loader arms and excavator to the ground, switch OFF the engine and remove the starter key.
- 2 Disconnect the battery.
- 3 Working in the cab, remove the steering wheel as shown.
- 4 Remove the fixings **A** (4 off) at positions shown and take off the steering column pedestal cover.
- 5 Remove the column switches **B**.
- 6 Remove the instrument panel **C**.
- 7 Remove the fixings **D** (4 off) securing the front console panel at positions shown and then carefully lift up the front console clear of the steering column assembly.

Replacement

Replacement is the reverse of the removal sequence.

Take care when removing/replacing the console panel to ensure that harnesses do not become snagged and that no other connections have been disturbed.

After re-fitting, operate the front/steering console controls and check they all function correctly.



A396920