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Zinc Plated Fasteners (golden finish)

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

Metric Grade 8.8 Bolts

Bolt size Dia.	(mm)	Hexagon (A/F) mm	Torque Settings Nm	kgf m	lbf ft
M5	(5)	8	7	0.7	5
M6	(6)	10	12	1.2	9
M8	(8)	13	28	3.0	21
M10	(10)	17	56	5.7	42
M12	(12)	19	98	10	72
M16	(16)	24	244	25	180
M18	(18)	27	350	36	258
M20	(20)	30	476	48	352
M24	(24)	36	822	84	607
M30	(30)	46	1633	166	1205
M36	(36)	55	2854	291	2105

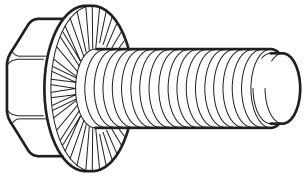
Metric - All Internal Hexagon Headed Cap Screws

Diameter mm	Torque Nm	kgf m	lbf ft
M3	2	0.2	1.5
M4	6	0.6	4.5
M5	11	1.1	8
M6	19	1.9	14
M8	46	4.7	34
M10	91	9.3	67
M12	159	16.2	117
M16	395	40	292
M18	550	56	406
M20	770	79	568
M24	1332	136	983

Metric Grade 10.9 Bolts

Bolt size Dia.	(mm)	Hexagon (A/F) mm	Torque Settings Nm	kgf m	lbf ft
M6	(6)	8	16	1.6	12
M8	(8)	13	39	4	29
M10	(10)	17	78	8	57
M12	(12)	19	137	14	101
M16	(16)	24	343	35	253
M20	(20)	30	657	67	485
M24	(24)	36	1157	118	853

Verbus Ripp Bolts



A343780

Torque settings for these bolts are determined by the application. Refer to the relevant procedure for the required settings.

Note: In most cases Verbus Ripp bolts should not be re-used. If one is disturbed it should be removed and a new one fitted in its place. For details of exceptions to this general rule, see T.I.'s 10/140 (F161/N. Am) and 10/141 (F162 N. Am).

Hydraulic Hose to Adapter Connections

BSP Size (inches)	Torque Settings Nm	kgf m	lbf ft
1/8	14	1.4	10
1/4	24	2.5	18
3/8	33	3.3	24
1/2	44	4.8	35
5/8	58	6.0	43
3/4	84	8.6	62
1	115	11.8	85
1 1/2	244	24.9	180

Hydraulic Adapter into Component Connections with bonded washers

BSP Size (inches)	Torque Settings Nm	kgf m	lbf ft
1/8	20	2.1	15
1/4	34	3.4	25
3/8	75	7.6	55
1/2	102	10.3	75
5/8	122	12.4	90
3/4	183	18.7	135
1	203	20.7	150
1 1/2	305	31	225

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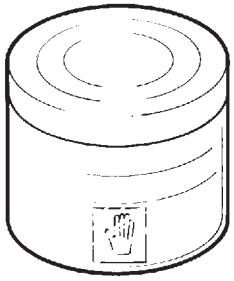
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Service Tools

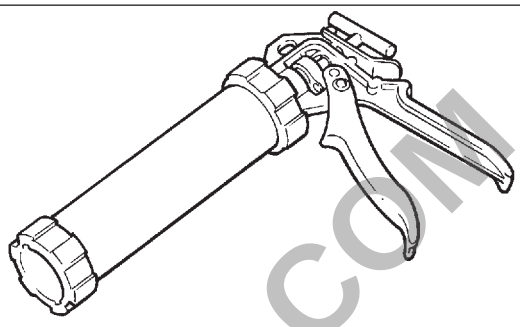
Section B - Body and Framework



S186240

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

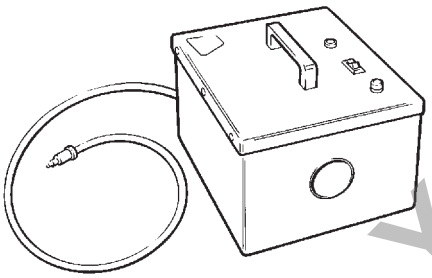
JCB part number - 4104/1310 (454g; 1lb tub)



S186270

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

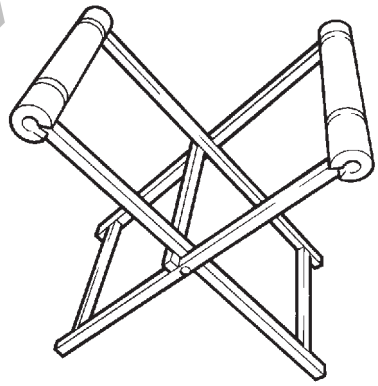
JCB part number - 892/00845



S186250

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).

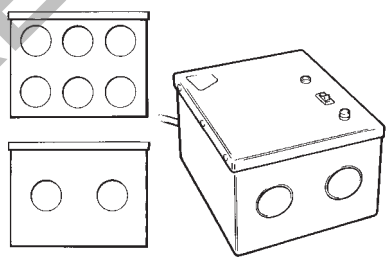
JCB part number - 992/12300



S186280

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

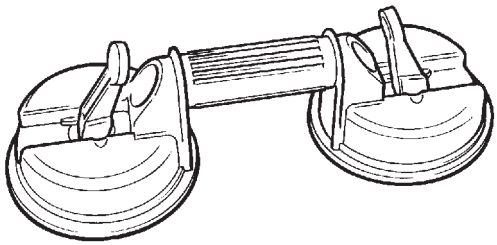
JCB part number - 892/00843



S186260

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



S186300

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

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Lubricants & Capacities (2000 Series Machines)

ITEM	CAPACITY Litres (UK Gal)	FLUID/LUBRICANT	MINIMUM INTERNATIONAL SPECIFICATION
* **Fuel**			
2115, 2125, 2135, 2140	220 (48)	Diesel Oil (See **Types of Fuel**)	ASTM D975-66T Nos. 1D, 2D
2150	350 (77)		
* **Engine (Oil)**			
2115, 2125, 2135, 2150	16.5 (3.6)	See **Engine Oil (All Machines)** at the beginning of this section	
2140	15 (3.3)		
* **Engine (Coolant)**			
2115, 2125, 2135, 2150	34 (7.5)	**JCB Four Seasons Antifreeze & Summer Coolant/water** (See **Coolant Mixtures**)	ASTM D3306, BS6580
2140	33 (7.3)		
PTO, Speed and Range Boxes (combined)	38 (8.4) † 42 (9.3) ††	**JCB Super Universal Agricultural**	API-GL-4, MIL-L-2105
Front Axle			
Housing	7 (1.56)	**JCB HD90 Gear Oil**	API-GL-5, MIL-L-2105C
Hubs (x2)	1.9 (0.4)		
Rear Axle (2WS)	23 (5.0)	**JCB HD90 Gear Oil**	API-GL-5, MIL-L-2105C
Rear Axle (4WS)			
Housing	17 (3.7)	**JCB HD90 Gear Oil**	API-GL-5, MIL-L-2105C
Hubs (x2)	2.0 (0.4)		
Brake System		**JCB Universal Brake Fluid**	SAE J1703 DOT 4
Front	0.75 (0.17)		
Rear	0.75 (0.17)	**⚠ CAUTION** **Do not use ordinary hydraulic fluid in the brake system.** 13-3-2-6	
† **Clutch System**	-	**JCB Light Hydraulic Fluid** - see **Note 2**	ISO VG15
Hydraulic System		**JCB High Performance Hydraulic Oil** (Above 38 °C, 100 °F)	ISO VG46
- see **Note 1**	82 (18.0) † 120 (26.4) ††	**JCB Hydraulic Fluid HP32** (Below 38 °C, 100 °F)	ISO VG32
Grease Points	---	**JCB HP Grease**	Lithium complex NLGI No. 2 consistency including extreme pressure additives
Air Conditioning System			
- Refrigerant	0.98 kg (2.16 lb)	**HFC R134a**	CH_2 FC F_3
- **Compressor Lubricant**	0.24 (0.05)	**Polyalkalineglycol**	PAG SP20
Front PTO Transfer Box (optional)	3.0 (0.67)	**JCB HD90 Gear Oil**	API-GL-5, MIL-L-2105C

Note 1: The total hydraulic system capacity depends on the equipment being used. Watch level indicator on hydraulic tank.

Note 2: It is esssential that the correct specification fluid is used. Contact your JCB Dealer for further information.

† 2000 Series to S/N 739999
†† 2000 Series from S/N 740000

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Every 10 Operating Hours or Daily whichever occurs first

Clean
1 Machine generally.

Drain
2 Air system tank.

Check (Engine Stopped)
3 Generally for damage.
4 Engine coolant level and condition.
5 Fuel system for leaks and contamination.
6 Hydraulic fluid level.
7 Hydraulic system for leaks.
8 Engine and transmission for oil leaks.
9 Gearbox oil level.
10 Engine oil level and condition.
11 Tightness of wheel nuts.
12 Windscreen washer level.
13 Tyre pressures and condition.
14 Security of front weights (optional equipment).
15 Seat belt condition and security.
16 Brake fluid levels.
* 17 Check radiator and coolers for blockage and clean if required.

Check (Engine Running)
18 Instrument readings and warning lights.
19 Operation of all electrical equipment.
20 Exhaust for excessive smoke.
21 Operation of clutch and footbrakes.
22 Parking brake operation.
23 Operation of steering.
24 Operation of transmission.
25 Operation of 3-point linkage.
26 Operation of front linkage (optional equipment).

Note: Some machines have grease nipples fitted to the external hydraulic control lever pivot points (see **External Hydraulics Control Valve Linkage, Lever Linkages** in section D). Grease at these points if the lever movement becomes stiff or independent operation becomes difficult.

Every 50 Operating Hours or Weekly whichever occurs first

Do the Daily jobs plus:

Drain
1 Fuel filter.
2 Fuel sediment bowl (all machines except those with optional fuel flow metering).
3 Fuel pre-filter (machines with optional fuel flow metering only)
4 Empty hydraulic coupling drain reservoir (if fitted)

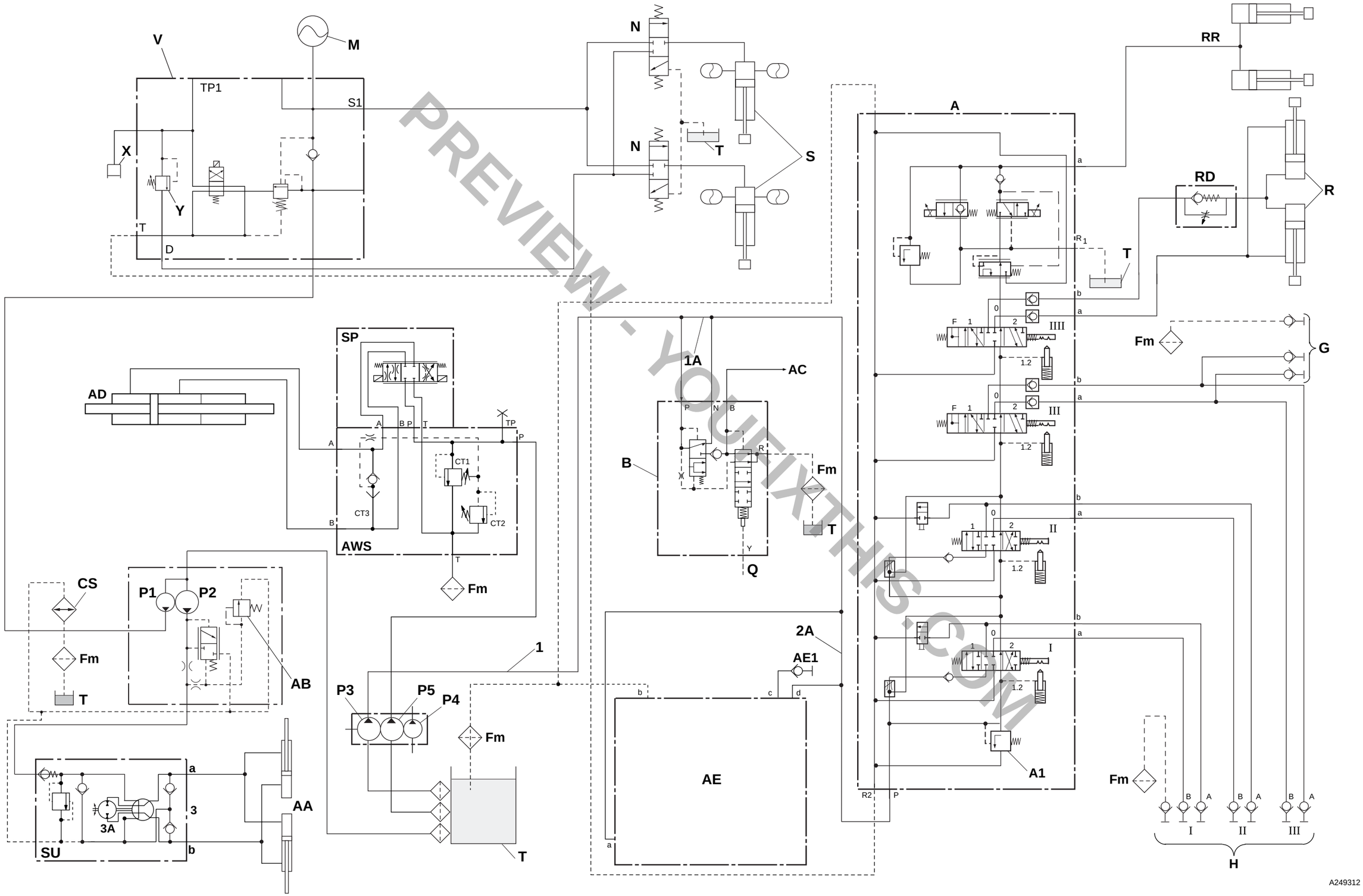
Check (Engine Stopped)
5 Fan belt tension and condition.
6 Air conditioning compressor drive belt.
7 Front PTO transfer gearbox oil level (optional equipment).
8 Clutch fluid level.
9 Cab air filter (Clean if required).
10 Propshaft Security

Grease
11 Rear PTO drive shaft splines and universal joints.
12 Rear PTO drive shaft bearings.
13 Front PTO drive shaft (optional equipment).
14 Front axle propshaft.
15 Rear axle propshaft.

Note: It is essential that drive shaft and propshaft joints are lubricated as specified.

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* Wiring Diagram - Early Machines

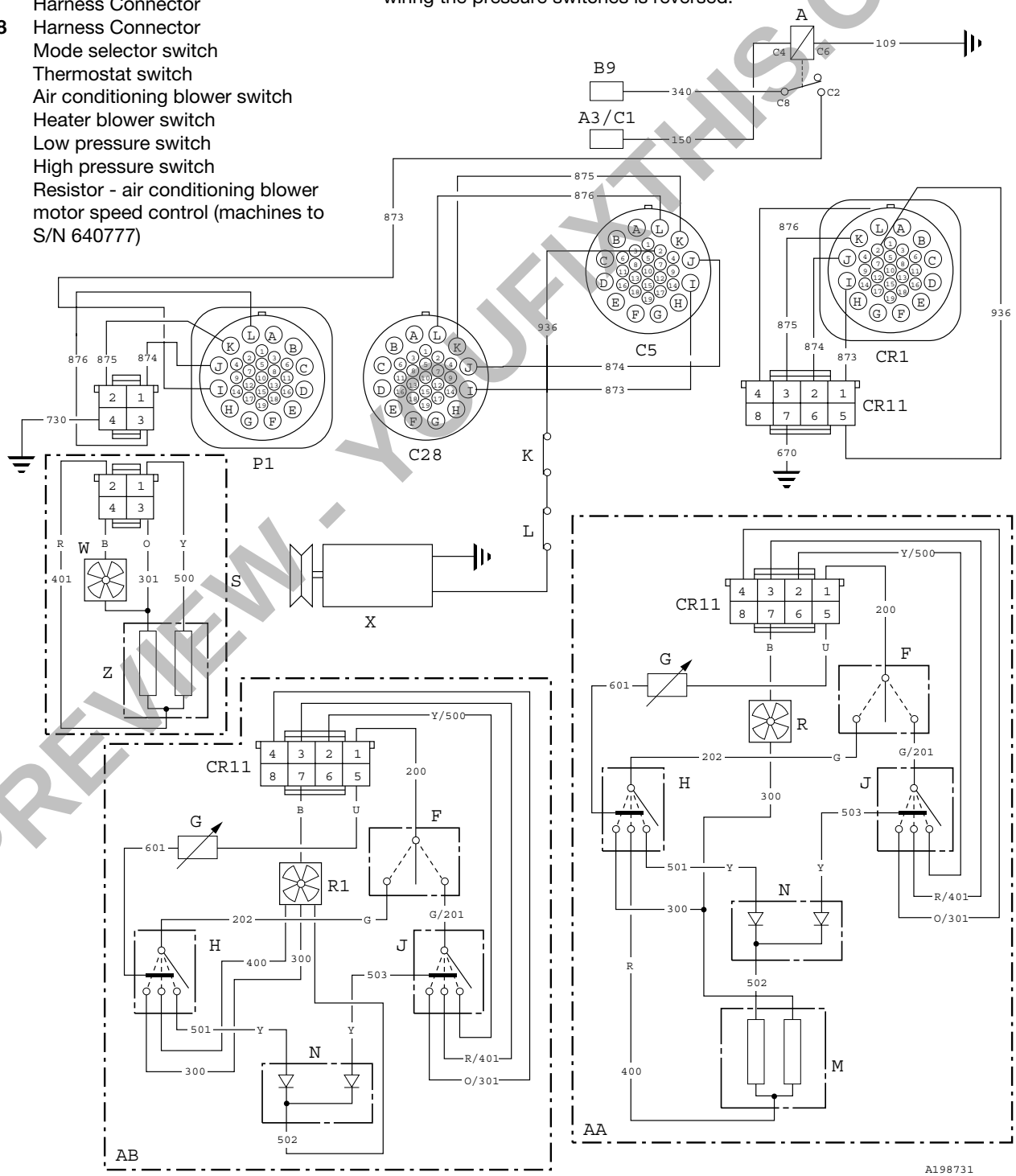
Component Key

A Air Conditioning Relay
AA Evaporator/blower unit and control panel (machines to S/N 640777)
AB Evaporator/blower unit and control panel (machines from S/N 640778)
A3/C1 Fuse
B9 Fuse
CR1 Harness Connector
CR11 Harness Connector
C5 Harness Connector
C28 Harness Connector
F Mode selector switch
G Thermostat switch
H Air conditioning blower switch
J Heater blower switch
K Low pressure switch
L High pressure switch
M Resistor - air conditioning blower motor speed control (machines to S/N 640777)
N Diode
P1 Harness Connector
R Air conditioning blower motor (machines to S/N 640777)
R1 Air conditioning blower motor/resistor assembly) (machines from S/N 640778)
S Heater Unit
W Heater blower motor
X Compressor
Z Resistor - heater blower motor speed control

Note: On some machines, the sequence of wiring the pressure switches is reversed.

Wire Colour Code

B Black
G Green
O Orange
R Red
U Blue
Y Yellow



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Error Codes - Transmission

The electronic transmission controller diagnostic system communicates problems to the operator via a series of codes.

Blink Codes (2000 Series to S/N 739999; 3000 series to S/N 641999)

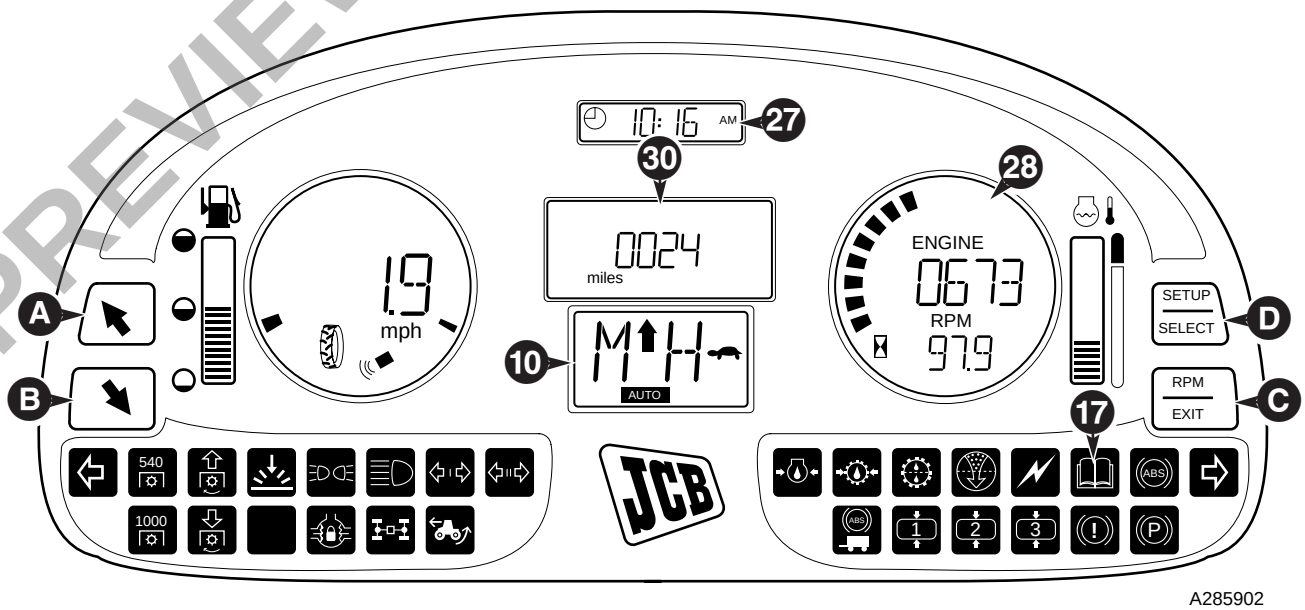
The blink codes are displayed via the snail, tortoise and hare Powershift icons on Gear Display **10**. The actual blink codes are shown as a slow flashing of one of the icons (approximately 1 second ON, 1 second OFF) followed by an obvious pause with the icon OFF. The number of flashes between pauses is the blink code. Interpret the blink codes as follows:

Icon Flashing	Blink Code	Fault Indicated
Snail	2	Snail solenoid - open circuit
Snail	4	Snail solenoid - short circuit or overloading
Tortoise	2	Tortoise solenoid - open circuit
Tortoise	4	Tortoise solenoid - short circuit or overloading
Hare	2	Hare solenoid - open circuit
Hare	4	Hare solenoid - short circuit or overloading

Number Error Codes (All Machines)

Transmission Electronic Control Unit (ECU) errors are drawn to the operators attention by the flashing of the 'book' icon **17**. This is accompanied by the showing of error codes on centre display **30**. The error code information alternates with the basic data (i.e. distance travelled) of centre display **30** in the form of 2 second displays of each. The error information begins with a statement of the number of errors in the system e.g. '3 ERRS', followed by up to 20 error codes displayed sequentially, e.g. 'ERR T022', in the order in which they occurred. If there are more than 20 error codes in the system, the opening statement will indicate that number, but only the first 20 will be identified.

* For diagnosis of the Error Codes, together with suggested remedial action, see **Diagnostic Error Codes - General**, this Section.



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Complete Transmission

If the problem is noise rather than loss of drive start at check 7.

	CHECK	ACTION
1	Is drive being transmitted to the road wheels?	YES: Check 7. NO: Check 2.
2	Is the clutch actuation system functioning?	YES: Check 3. NO: * Check clutch actuation. See **Note 2** below.
3	Is the clutch slipping?	YES: * Examine and repair clutch. See **Note 2** below. NO: Check 4.
4	Are range and speed gearboxes both in gear?	YES: Check 5. NO: Engage gear/check gearchange linkages.
5	Is 6-speed gearbox heard to drive with the range gearbox in neutral?	YES: Check 6. NO: Remove and examine 6-speed gearbox.
6	Does rear axle driveshaft rotate with both gearboxes in gear?	YES: Check rear axle. NO: Check range gearbox.
7	Is fault noise rather than loss of drive?	YES: Check 8. NO: Check 10.
8	Is transmission noisy with speed gearbox in gear and range gearbox in neutral?	YES: Examine speed gearbox for worn/damaged components. NO: Check 9.
9	Isolate noise source to range box or rear axle or front axle by disconnecting relevant drive shafts.	Examine relevant transmission element for worn/damaged components.
10	Is transmission oil level low?	YES: Fill to correct level.

* **Note 1:** When carrying out fault finding on the transmission always check for any error codes that may have been generated by the electronic management system. See **Fault Finding (Electronic Management System**) Section C.

* **Note 2:** For machines fitted with a wet master clutch transmission see **Fault Finding - Wet Master Clutch**.

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Main Connectors

Connector	Description	Mating Connector	Connector	Description	Mating Connector
A2	Rear bulkhead	**ABS 2**	**CR43**	Column switch	---
ABS1	ABS trailer socket	---	**CR49**	Powershift ECU 1 (Black)	---
ABS2	Rear bulkhead	**A2**	**CR50**	Powershift ECU 2 (Red)	---
AHL1	Auxiliary lights connector	---	**CR51**	Front bulkhead	**C28**
AHL2	Auxiliary lights connector	---	**CR64**	4WS option (2000 Series)	**C4**
C1 (14-pin)	Trailer socket	---	**CR65**	Instrument cluster 1 (Black)	---
C1 (10-pin)	Control module	**CP3**	**CR66**	Instrument cluster 2 (Red)	---
C2	Control module	**CP2**	**CR73**	Panel - auxiliary light interconnect	---
C4	4WS interconnect - if fitted (2000 Series)	**CR64**	**CR74**	Panel - auxiliary light interconnect	---
			CR87	Vansco instrument cluster	**E4**
C5	Rear bulkhead	**CR1**	**CR89**	Diagnostic connector	---
C28	Front bulkhead	**CR51**	**E1**	EDC ECU	---
CP1	Control module	---	**E2**	Control panel	---
CP2	Control module	**C2**	**E4**	Vansco instrument cluster	**CR87**
CP3	Control module	**C1** (10-pin)	**E15**	Bulkhead	**E16**
CR1	Rear bulkhead	**C5**	**E16**	Bulkhead	**E15**

Connector Terminals

Instrument Cluster
CR65 (Black)

Terminal	Wire	Function
1	406	Low air pressure - 2
2	409	Low brake fluid level
3	408	Low air pressure - 3
4	434	Low transmission oil pressure
5	-	
6	-	
7	899A	Differential lock solenoid
8	415	Area cut-out
9	482	Low range
10	473	Auto
11	476	Snail
12	474	Hare
13	420	2WD selected
14	880B	Side lights
15	511	Option present
16	402	Low engine oil pressure
17	405	Transmission oil filter blocked
18	444	540 PTO range selected
19	445	1000 PTO range selected
20	440	Trailer ABS warning
21	481	Reverse range
22	857B	Rear PTO drive selected
23	477B	Low range selected
24	475	Tortoise
25	861G	Right turn signal
26	418	Main beam
27	419	2nd trailer turn signal
28	417	1st trailer turn signal
29	496	4WS tracking (2000 Series - if fitted)
30	407	Low air pressure - 1
31	400A	Park brake ON
32	-	
33	404	Air filter blocked
34	480B	Reverse range selected
35	848B	Front PTO drive selected
36	509B	EDC lower signal

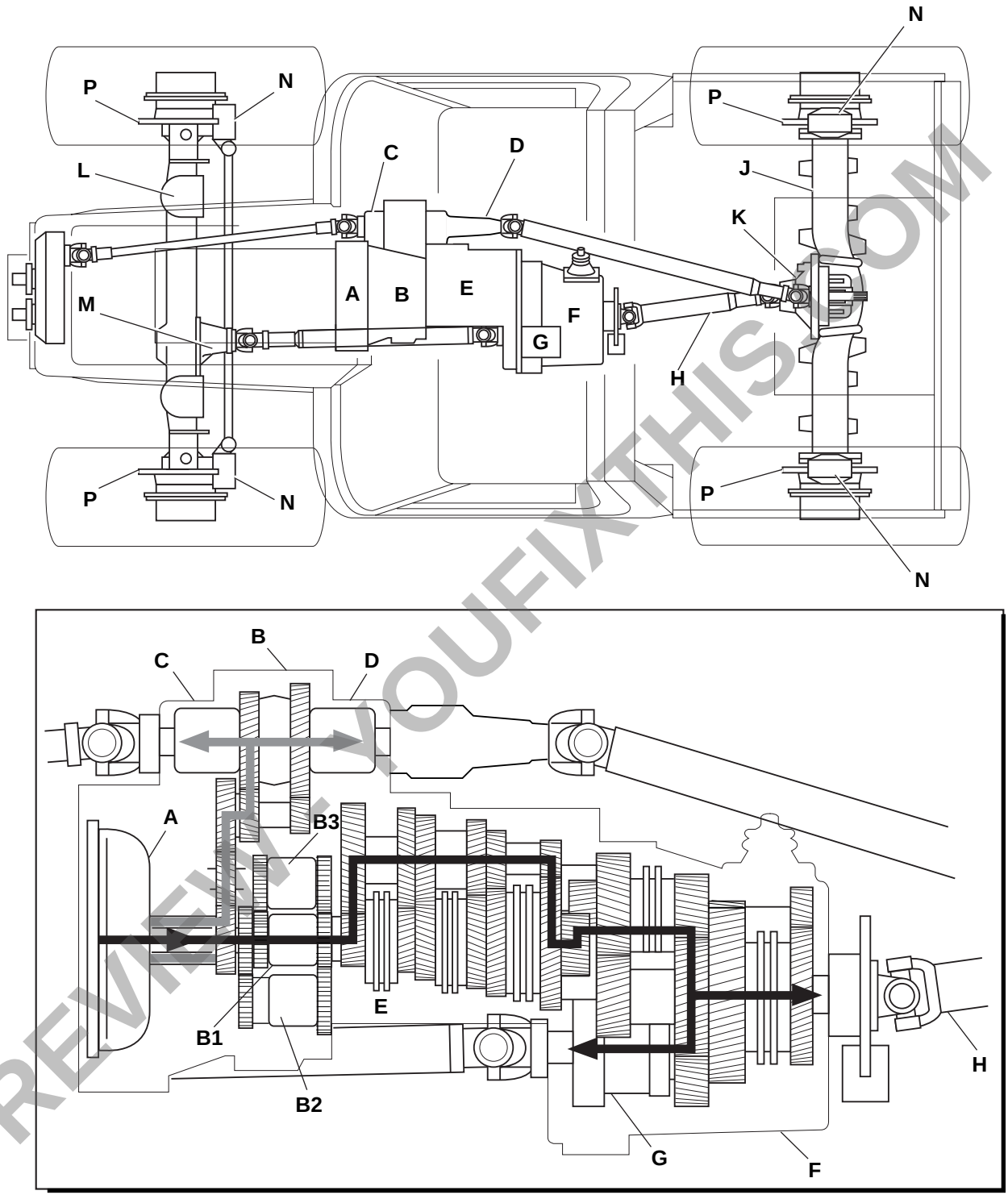
Instrument Cluster
CR66 (Red)

Terminal	Wire	Function
1	479B	High range selected
2	512	Fuel feed signal
3	502	Fuel return signal
4	414A	Transmission speed signal
5	410	Engine water temperature
6	411	Fuel level
7	500A	Radar speed signal
8	517	RS232 RX
9	423	Buzzer out
10	898	<20 kph speed trigger
11	485	>3 kph speed trigger
12	505	Increase wheel slip output
13	484	High range
14	859G	Left turn signal
15	483	Medium range
16	478B	Medium range selected
17	403A	Alternator charge
18	510	Wheel slip setpoint
19	516	RS232 TX
20	486	>1 kph speed trigger
21	508	Decrease wheel slip output
22	416	Differential lock cut-out
23	514F	CANL
24	515F	CANH
25	501	Radar presence signal
26	497	Transmission speed sensor presence
27	-	
28	-	
29	-	
30	412A	Engine rpm
31	513	Program
32	-	
33	300B	+ 12V Battery
34	160B	+ 12V ignition
35	710C	Battery earth
36	626	Chassis earth

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* **Note:** The hydraulic tank shown below on the right hand side of the machine is that for the Fastrac 2115, 2125, 2135 and 2140 machines. On the Fastrac 2150, 3155 and 3185 machines the hydraulic tank is on the left hand side of the machine.

Checking the Fluid Level

⚠ WARNING

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 quickly.

INT-3-1-10/1

⚠ CAUTION

Using incorrect fluid could damage the system. See Fluids, Capacities and Lubricants for the correct fluid. The fluid can harm your skin. Wear rubber gloves. Cover cuts or grazes.

2-3-5-1/2

1 Park the machine on level ground. Apply the parking brake. Lower any mounted implements to the ground. Stop the engine. Remove the starter key.

2 Look at the fluid level in the sight gauge **A**. The level should be between the two marks on the gauge. If the fluid is cloudy, water or air has entered the system. Water or air in the system could damage the hydraulic pump.

3 If necessary, add recommended fluid at tank cap **B**.

Changing the Filter Element

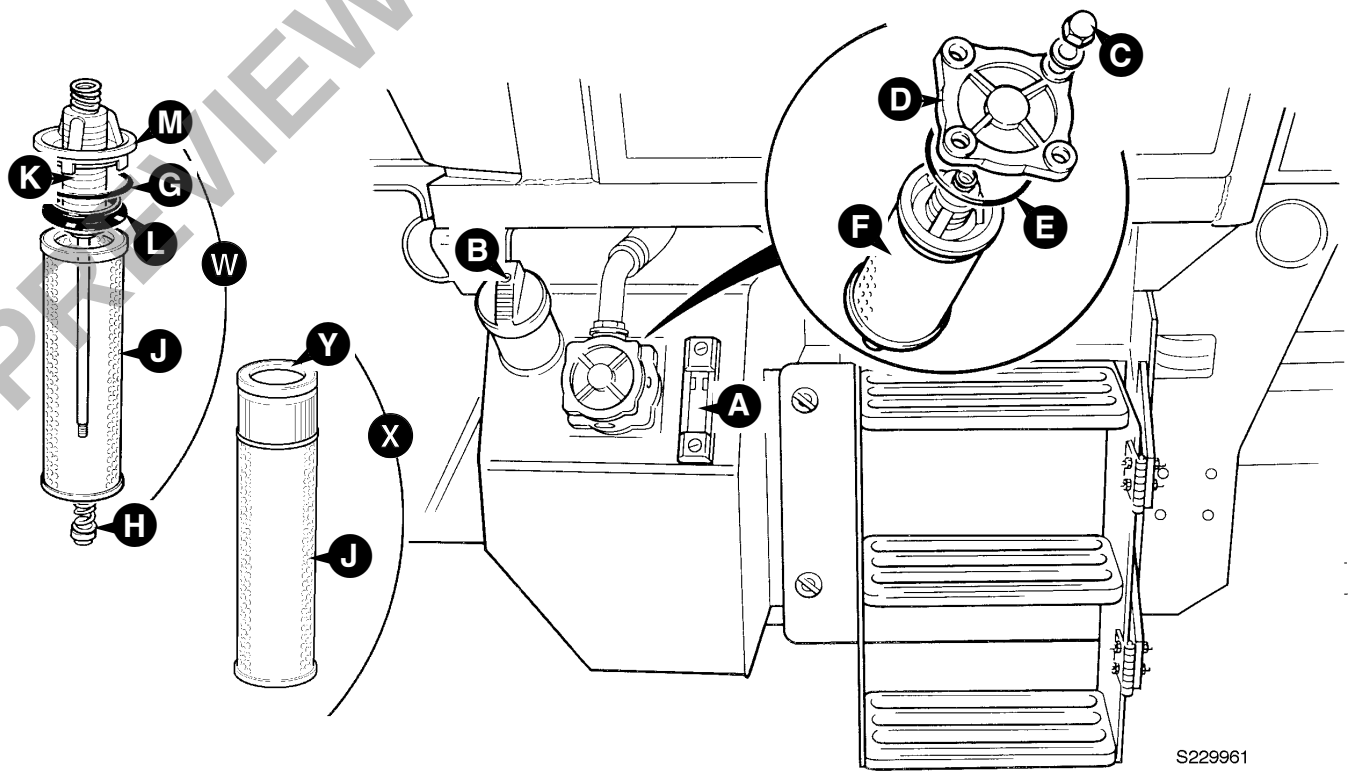
1 Park the machine on level ground. Apply the parking brake. Lower the rear linkage to the ground. Stop the engine. Remove the starter key. Wash off all dirt from around the tank cap **B** and element cover plate **D**.

2 Remove the element as follows:

- **a** Remove tank cap **B.**
- **b** Remove nuts **C**, cover plate **D** and 'O' ring **E**.
- **c** Remove the element assembly **F** and 'O' ring **G**.
- **d** Remove the nut and spring assembly **H**. Remove the element **J** from its spindle.
- **e** **i** *Dry clutch machines* - discard the complete element **J** (see view **W**).
  - **ii** *Wet clutch machines* - remove and discard the paper insert **Y** from metal outer element **J** (see view **X**).
- **f** *Wet clutch machines only* - clean the metal outer element **J**.
- **g** Clean the magnets **K**.

3 Fit the new element as follows:

- **a** *Wet clutch machines* - fit a new paper insert into metal outer element **J**.
- **b** Assemble the new element **J** (dry clutch machines) or refurbished element **J/Y** (wet clutch machines) on to the spindle, using a new seal **L.** Ensure that the top lip of the seal locates in the groove inside the filter head **M.** Fit and tighten the nut and spring assembly **H.**
- **c** Fit the element assembly **F** using a new 'O' ring **G.**
- **d** Refit cover plate **D** and nuts **C** using a new 'O' ring **E.**
- **e** Tighten nuts **C** to 7 Nm (5 lbf ft).
- **f** Top up fluid level at tank cap **B** and refit cap.



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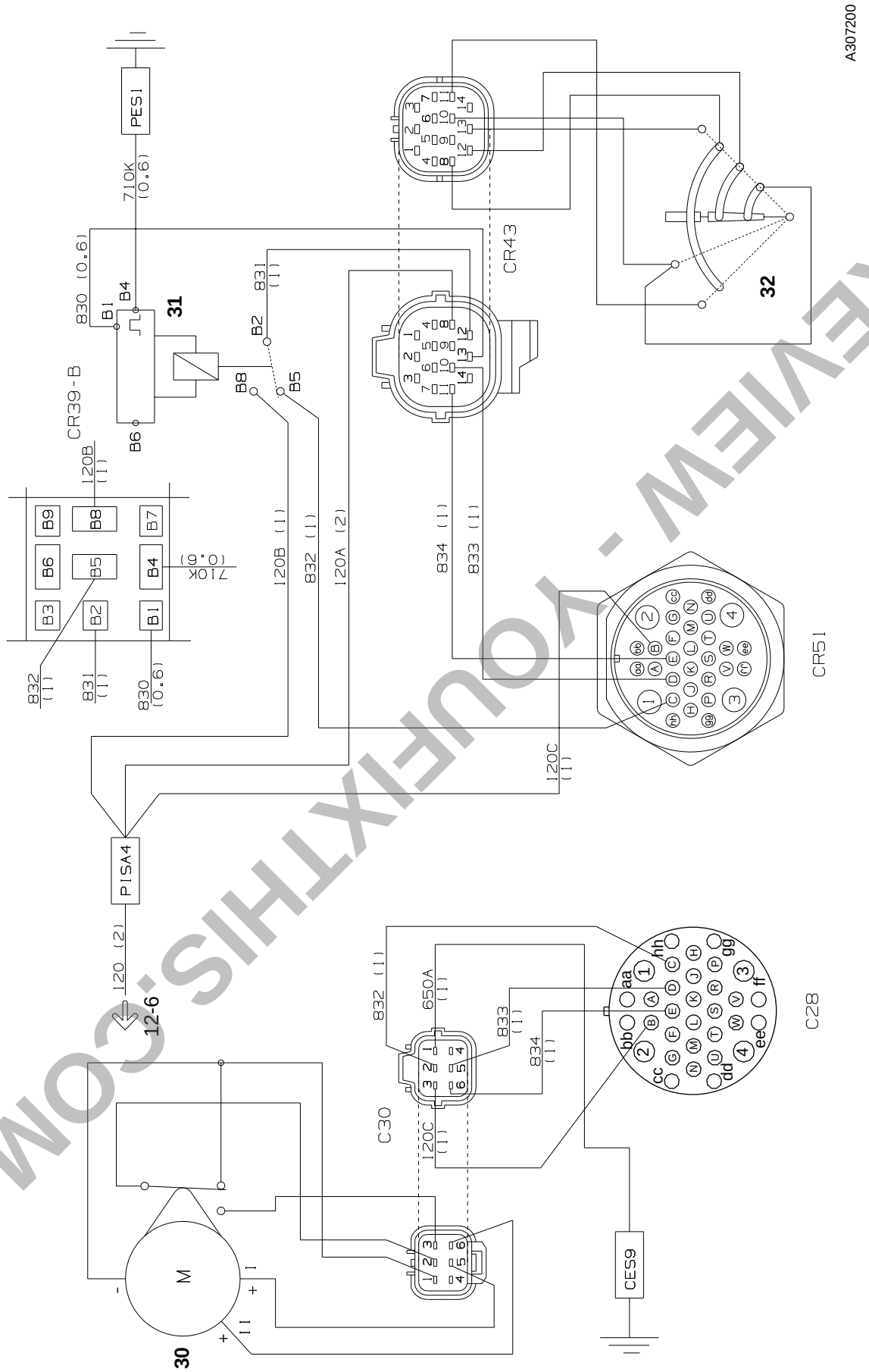
Air Conditioning System

	2000 Series	3000 Series
* **Refrigerant**		
Refrigerant Type	HFC R134a	HFC R134a
Refrigerant Charge Weight	0.9 kg (2 lb)	1.42 kg (3 lb 2oz)
Compressor Lubricant		
- Type	PAG SP20	PAG SP20
- Quantity	240 c.c. (0.05 UK gal)	240 c.c. (0.05 UK gal)
* **Switch Pressures**		
Low Pressure Switch		
- Cut in	> 2.35 bar (> 34 lb/in^2)	> 2.35 bar (> 34 lb/in^2)
- Cut out	< 0.4 bar (< 6 lb/in^2)	< 0.4 bar (< 6 lb/in^2)
High Pressure Switch		
- Cut in	< 19.3 bar (< 280 lb/in^2)	< 19.3 bar (< 280 lb/in^2)
- Cut out	> 27.6 bar (> 400 lb/in^2)	> 27.6 bar (> 400 lb/in^2)

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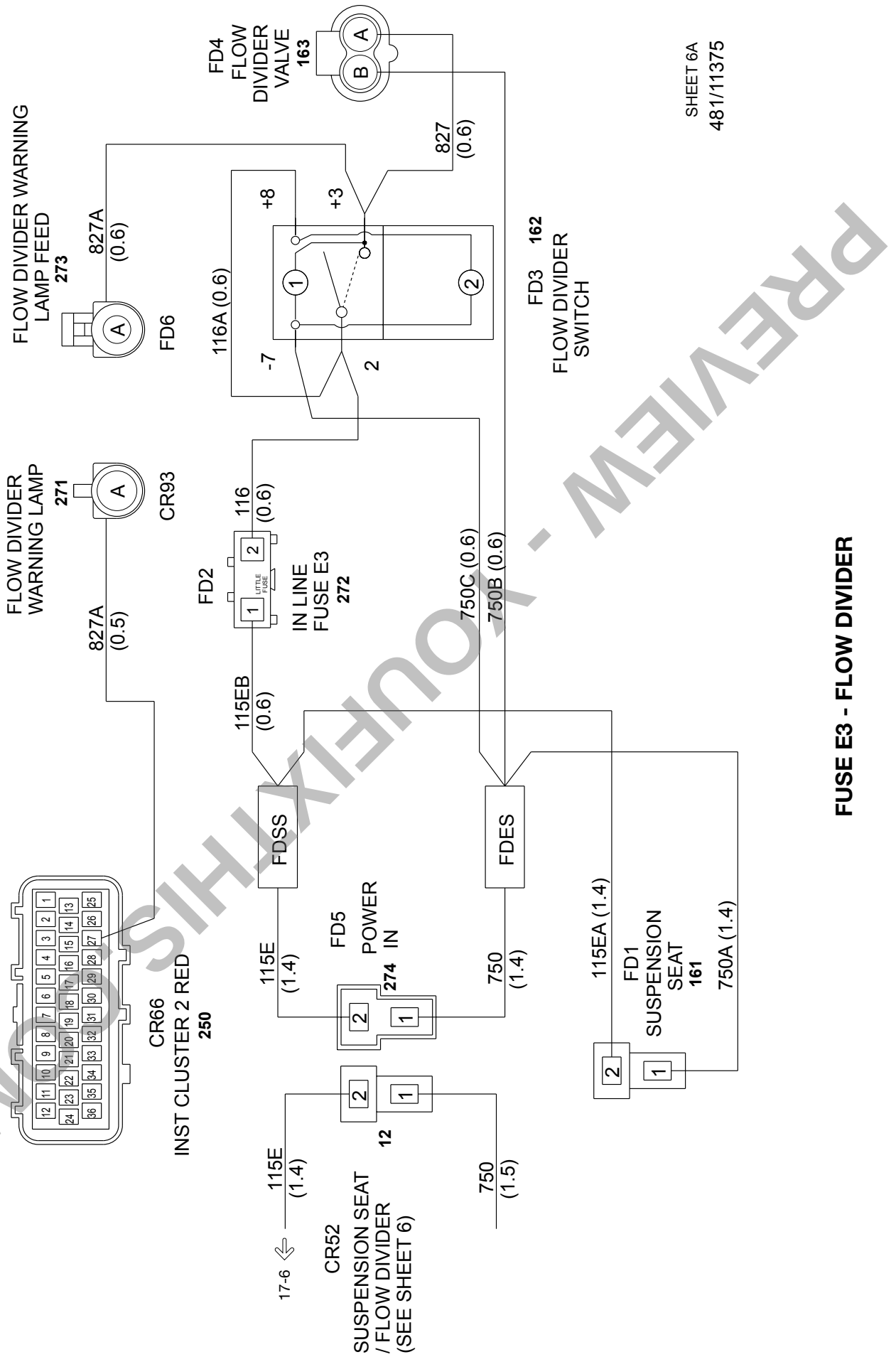
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FUSE A4 (CONT'D) - FRONT WASH/WIPE

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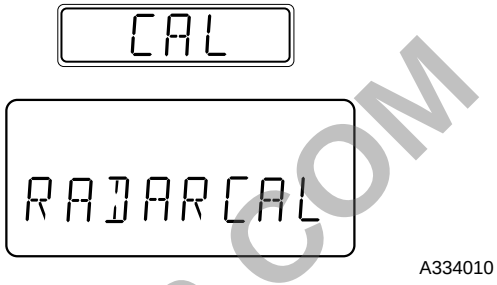
Programming (continued)

Level '1' Programming Mode (continued)

8 To re-calibrate the radar, accurately measure a distance along the ground of 100 metres in a straight line from the point directly below the centre of a wheel hub. Mark a line at this point.

Ensure that the clock display **27** is showing 'CAL' and drive the tractor along the course to the point where the wheel hub is directly above the mark made 100 metres from the start position. It is advised that someone walks alongside the tractor to ensure that the final position is accurate.

When the 100 metre mark is reached, exit Level '1' Programming Mode to complete the calibration.



A334010

* **Note:** During the 100 metre run, display **27** changes from displaying 'CAL' to a continually increasing number. This number ceases to increase at the end of the run. The final value displayed is the value in pulses/metre which is stored as the calibration value. If this value differs by more than ±10% from the factory set value (132.7 for UK machines, 131.8 for non-UK machines), then the value is deemed invalid and the calibration value defaults to the setting in use before calibration started. If this happens, recheck the 100 metre measurement and repeat the calibration. If still unsatisfactory, the radar unit should be checked using Wingst or the Psion (see **Wingst Program** or **Psion Walkabout**, this Section.

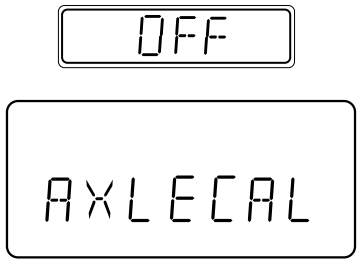
9 To return to the MPH-KPH mode (step **1**) press SET UP/SELECT button **D**. To exit level 1 programming either switch the ignition OFF or start the engine or press EXIT/RPM button **C**.

10 **From EMS Software Version 7.00 onwards**
To check the axle speed sensor (which calculates the machine's actual speed), press SET UP/SELECT button **D** to initiate the flashing message 'AXLECAL' on centre display **30**. The clock display **27** shows one of the following:

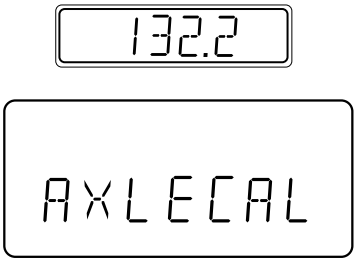
a OFF. The factory set calibration value will be used by the EMS.

b The current numerical calibration value in pulses/metre (132.2 in the example shown).

c CAL. Ready to do a new calibration.



A386140



A386150

Note: Axle sensor calibration should only be necessary if the operator has reason to suspect that it is inaccurate. It should be carried out on level ground in dry conditions. Any wheel slippage will cause inaccuracies.

Depending on the requirement, press button **A** or button **B** to toggle between the current value stored for axle sensor OFF (a), axle sensor calibration (b) or CAL (c).

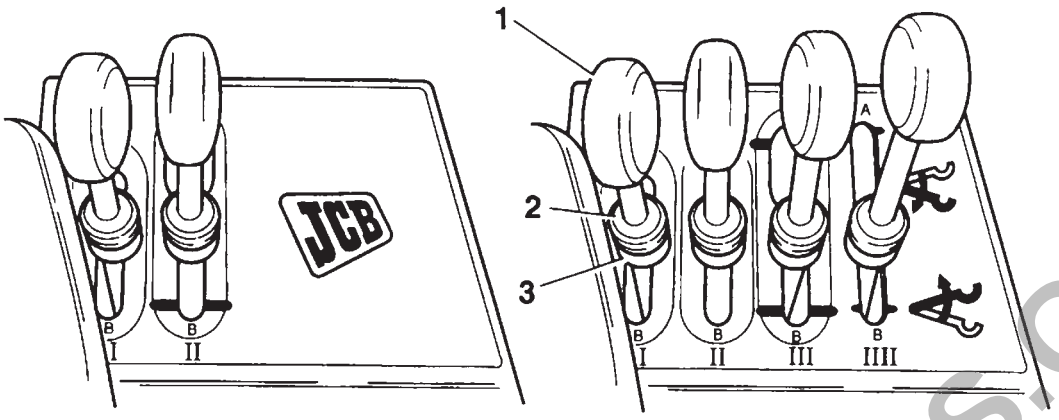
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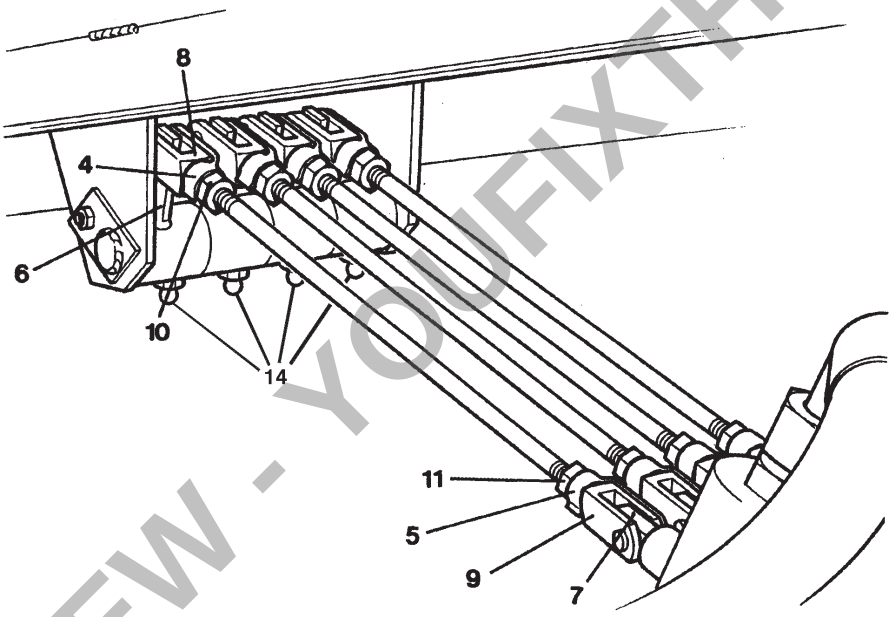
Code	Description	Possible Cause	Action and Remedy
T027	M ram in solenoid open circuit	Internal breakdown of solenoid coil. Wiring fault.	Check individual solenoid for continuity, as guided by the individual fault code. Check supply and wiring between Transmission ECU and relevant solenoid(s); refer to wiring diagram. **Note**: if either all four neutral solenoids or all four engage solenoids are showing failures, it is likely to be a supply fault. If there is only one solenoid failure, it is likely to be an individual solenoid return.
T028	H ram in solenoid open circuit	Internal breakdown of solenoid coil. Wiring fault.	Check individual solenoid for continuity, as guided by the individual fault code. Check supply and wiring between Transmission ECU and relevant solenoid(s); refer to wiring diagram. **Note**: if either all four neutral solenoids or all four engage solenoids are showing failures, it is likely to be a supply fault. If there is only one solenoid failure, it is likely to be an individual solenoid return.
T029	L ram out solenoid open circuit	Internal breakdown of solenoid coil. Wiring fault.	Check individual solenoid for continuity, as guided by the individual fault code. Check supply and wiring between Transmission ECU and relevant solenoid(s); refer to wiring diagram. **Note**: if either all four neutral solenoids or all four engage solenoids are showing failures, it is likely to be a supply fault. If there is only one solenoid failure, it is likely to be an individual solenoid return.
T030	R ram out solenoid open circuit	Internal breakdown of solenoid coil. Wiring fault.	Check individual solenoid for continuity, as guided by the individual fault code. Check supply and wiring between Transmission ECU and relevant solenoid(s); refer to wiring diagram. **Note**: if either all four neutral solenoids or all four engage solenoids are showing failures, it is likely to be a supply fault. If there is only one solenoid failure, it is likely to be an individual solenoid return.
T031	M ram out solenoid open circuit	Internal breakdown of solenoid coil. Wiring fault.	Check individual solenoid for continuity, as guided by the individual fault code. Check supply and wiring between Transmission ECU and relevant solenoid(s); refer to wiring diagram. **Note**: if either all four neutral solenoids or all four engage solenoids are showing failures, it is likely to be a supply fault. If there is only one solenoid failure, it is likely to be an individual solenoid return.
T032	H ram out solenoid open circuit	Internal breakdown of solenoid coil. Wiring fault.	Check individual solenoid for continuity, as guided by the individual fault code. Check supply and wiring between Transmission ECU and relevant solenoid(s); refer to wiring diagram. Note: if either all four neutral solenoids or all four engage solenoids are showing failures, it is likely to be a supply fault. If there is only one solenoid failure, it is likely to be an individual solenoid return.

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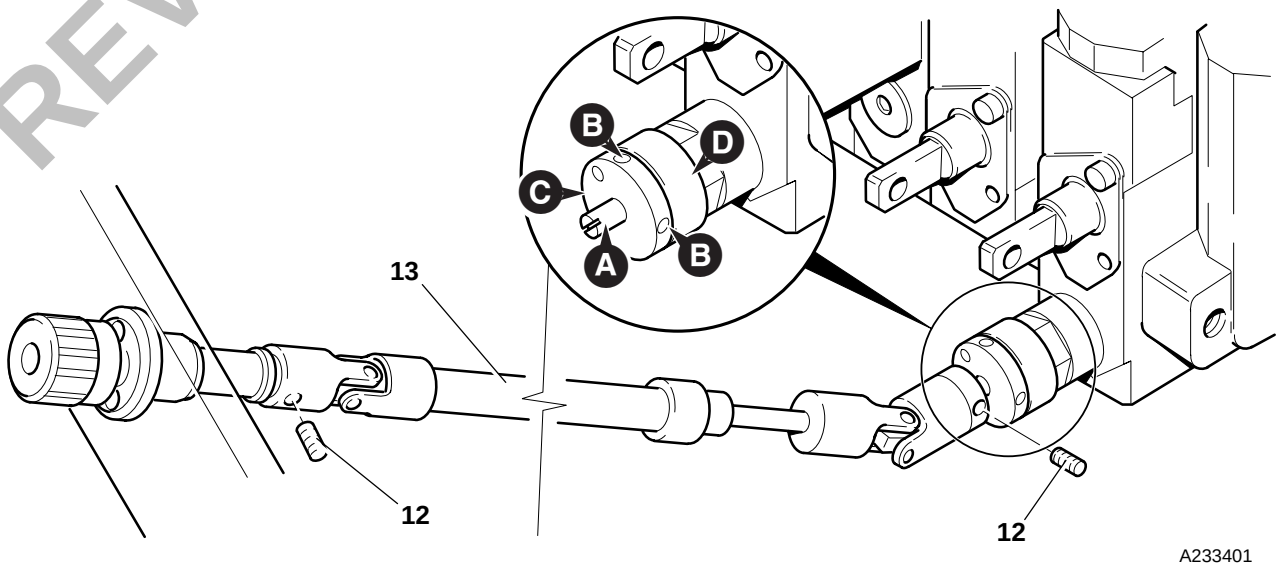
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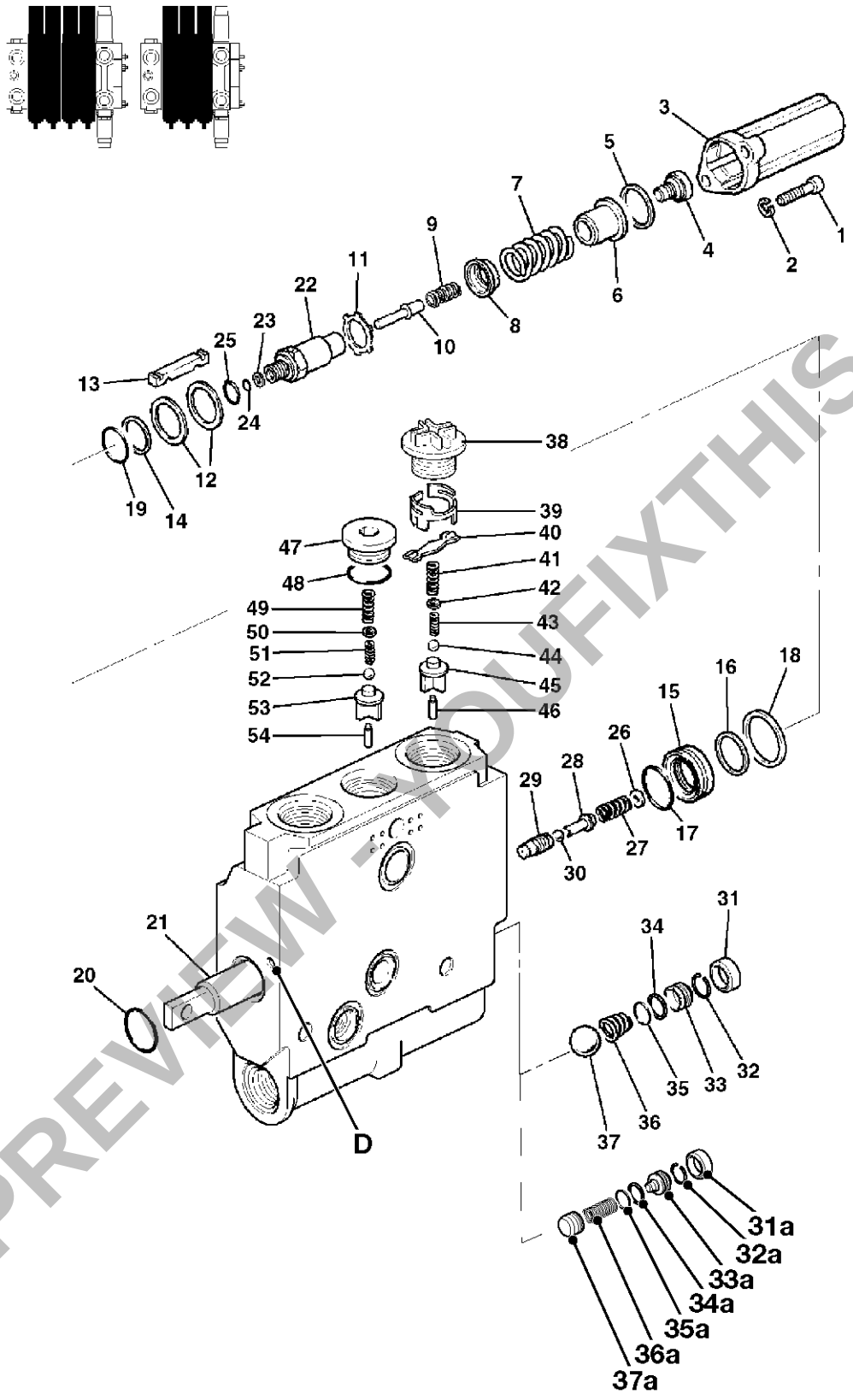
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Powershift Control Valves

Note: Solenoid valves can be removed individually. Although the following procedure describes one particular valve, the same can be applied to all three.

Removal

1 Drain the transmission oil from the PTO gearbox. If the oil is not being changed, take precautions to prevent contamination.

2 If necessary, disconnect the front propshaft at the range box end to improve access to the valve.

3 Un-clip electrical plug from the solenoid.

4 Unscrew the four capscrews **A**. Remove the solenoid valve from the transmission casing. Discard the 'O' rings **B**.

Replacement

Note: Before refitting the valve, ensure that the five plugs **C** and grub screw **D** are in place and secure in the transmission casing orifices. Note that the plug and screw positions are only applicable to machines with dry clutch transmissions. For detailed information on plugs for wet clutch transmissions see **PTO/Splitter Gearbox, Housing - Wet Clutch Transmission**.

1 Refit solenoid valve to the transmission casing and secure with capscrews **A**. Do not over tighten.

2 Re-connect electrical plug to the solenoid valve.

3 Refill the transmission (PTO, speed and range gearboxes) to the correct level (see **Lubricants and Capacities**, Section 3).

4 If previously disconnected, re-install the front propshaft. Tighten the flange bolts to a torque of 78 Nm (57 lbf ft).

5 Run the machine and check for oil leaks. Re-check the transmission oil level.

Accumulator

When renewing or refitting the accumulator **E**, coat the threads with JCB Threadlocker and Sealer before installing.

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Selector Shaft and Forks

Dismantling and Assembly

The numerical sequence shown on the illustration is intended as a guide to dismantling.

For assembly, the sequence should be reversed.

When Dismantling

Note the positions of forks **2, 3** and **4** relative to keys **1** and **7**.
(The rear slots **A** are not used.)

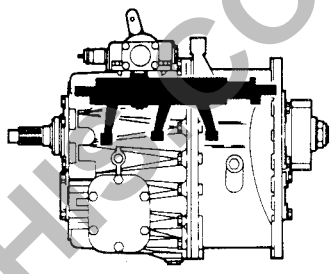
Hold the assembly by the selector block **6** and withdraw key **1** from the rear. Remove forks **2, 3** and **4**.

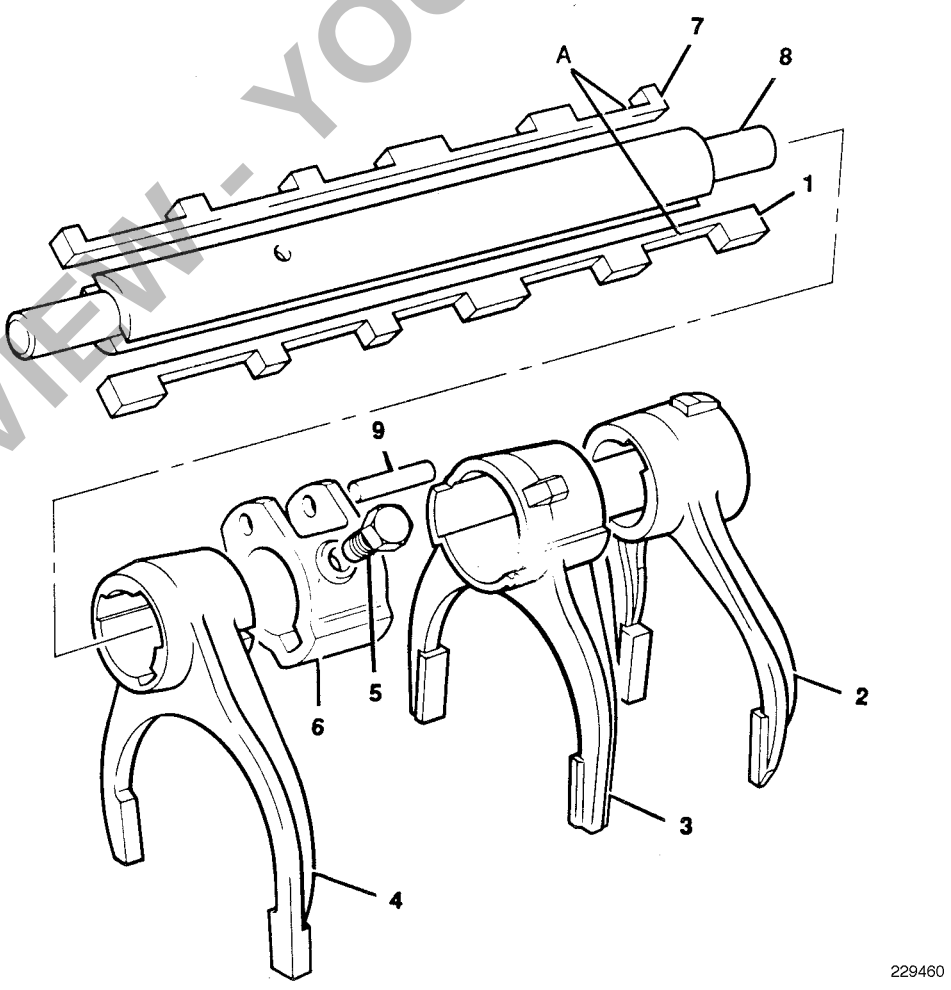
Remove bolt **5** and separate the selector block **6** from the shaft **8**.

When Assembling

If re-using bolt **5** apply JCB Retainer (High Strength). (New bolts are supplied ready coated with a patch of retaining compound.)

	Item	Nm	kgf m	lbf ft
*	**5**	35-39	3.6 - 4.0	25-29





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Rear PTO Output Shaft

General

All models have a two speed capability for PTO drive. Two rear PTO output shafts are available, as detailed below, to suit differing implement shaft sizes, speeds and power requirements.

The standard 35 mm (1 3/8 in) output shaft **A** has 6 splines at one end (for 540 PTO RPM operation) and 21 splines at the other end (for 1000 PTO RPM operation).

The optional 45 mm (1 3/4 in) shaft **B** is available in either 6 or 20 spline versions.

As a general rule, only use the 6 spline (540 PTO RPM) end of shaft **A** for equipment having a power requirement of less than 49 kW (65 hp). Equipment needing a higher power output should be run at 1000 PTO RPM, using the 21 (**A**) or 20 (**B**) splined drive.

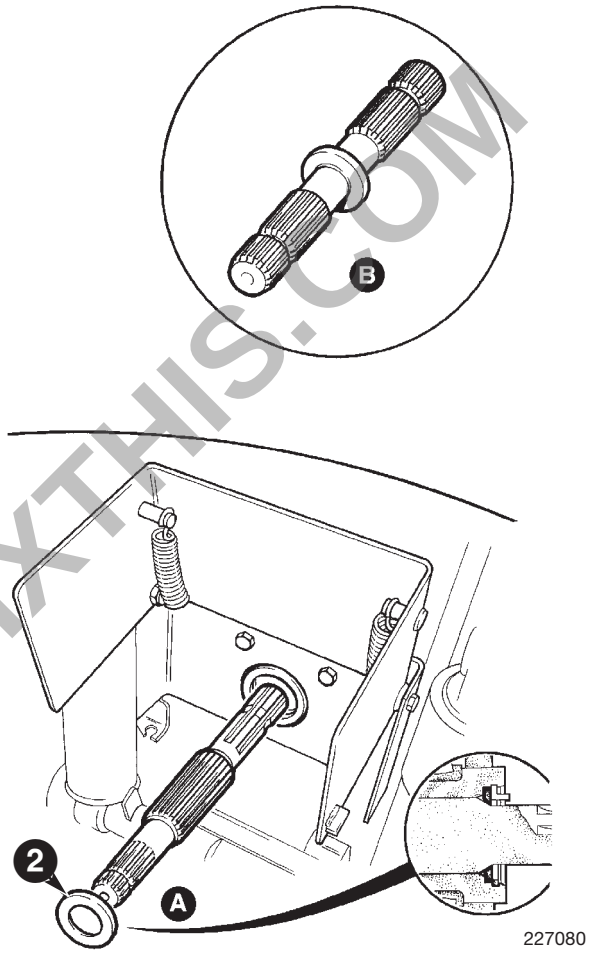
Fitting

Refer to the illustration on page 57 - 1 for the numerical annotations.

Tilt the PTO guard **5** upwards to gain access.

To reverse standard shaft **A**, remove the circlip **1**, washer **2** and withdraw the shaft. Insert the shaft facing the opposite way and refit the washer and circlip. Ensure that the washer is fitted with the chamfer towards the shaft housing.

When optional shaft **B** is required, fit the shaft either way round and secure with circlip **1**. Do not fit the washer **2**.



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FAULT	ACTION
3 4WS Fails to engage, rear axle remains locked in 2WS	**3 Check the Diagnostic LED's** 3.1 Remove the 4WS control panel to reveal the diagnostic LED's (see **Diagnostic LED's**). 3.2 When the ignition switch is turned on, LED's 2 and 3 should be on, indicating the rear axle is locked and the machine is stationary. 3.3 When the engine is started, LED's 2, 3 and 5 should be on (LED 5 indicates engine running.) 3.4 When an attempt to select 4WS is made, LED 6 should come on (air solenoid valve signal) and LED's 7 and 8 should cycle off in turn. Check each of the 4WS modes and crab steer in turn. If each of the LED's operates in the sequence shown above, then check for the following faults: a) Rear axle power track rod lock failed to release. b) Rear axle power track rod switch has failed. c) 4WS electronics out of calibration. d) The rear axle sensor mechanical linkage has developed backlash. **a Rear axle power track rod lock failed to release.** a1 Check that air pressure is present at the power track rod feed. a2 In 2WS there should be no pressure. a3 As 4WS is selected, pressure should be present to unlock the axle. If no pressure is detected, check the air solenoid valve (inside cab) is operating correctly. **b) Rear axle power track rod switch has failed.** b1 If the power track rod lock has released but the switch has failed to signal the ECU, the rear wheels will be seen to 'dither' (slowly oscillate from side to side) while the 4WS selection is being made. b2 The switch may be out of adjustment and can be checked by removing the copper washer fitted behind the switch. b3 If the switch still fails to operate, a replacement is required. Be sure to replace the copper washer if a new switch is fitted. b4 If the unit still fails to operate, check the wiring harness continuity. **c) 4WS electronics out of calibration.** c1 As 4WS selection is attempted, observe LED's 7 and 8. The LED's should cycle on and off in turn. If there is a bias towards one of the LED's or if one of the LED's remains lit continually, then the 4WS electronic panel is out of calibration (see Calibration procedure in **Sensors,** Section C). Calibration is normally needed only after sensors or control unit have been dismantled. If frequent calibration is needed, the rear axle sensor has probably developed backlash. **d) The rear axle sensor mechanical linkage has developed backlash.** Remove sensor (potentiometer) top cover. Check the sensor linkage for backlash by fitting an open ended spanner over the spindle where it protrudes above the sensor. Apply moderate pressure in each direction. There should be no detectable backlash.

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