



Section D

Controls

Service Manual - Fastrac 2155 and 2170

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Technical Data

JCB Selectronic

Pneumatic Cylinders

Piston bore and stroke	40 mm x 50 mm	1.57 in x 1.97 in
Maximum operating pressure	See Pressure Regulator , Pressure Setting (below)	

Microswitches

Reed switch type	500 Ma
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Solenoid Valves

Maximum operating pressure	7 bar	102 lbf/in ²
Supply voltage	12V DC (-15% to + 10%)	

Pressure Regulator

Type	Pressure reducing valve	
Pressure setting	4.5 bar	65 lbf/in ²

External Hydraulics

Control Valve Linkage

Lever Linkages

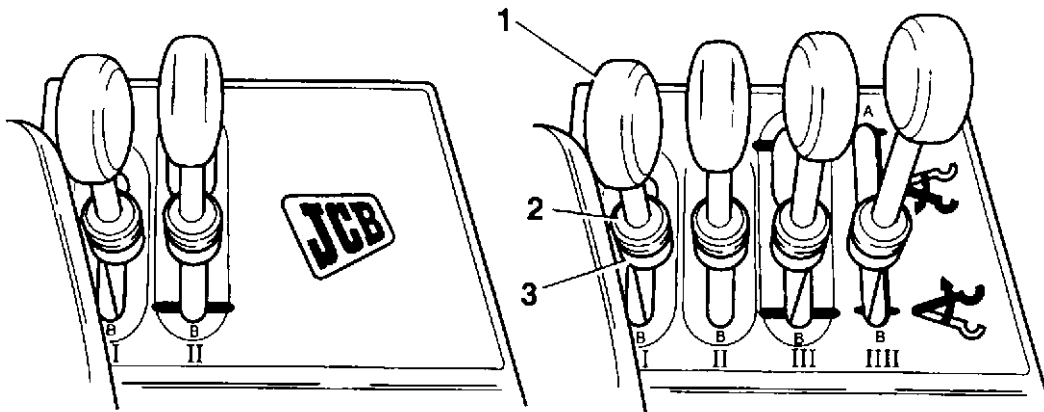


Fig 1.

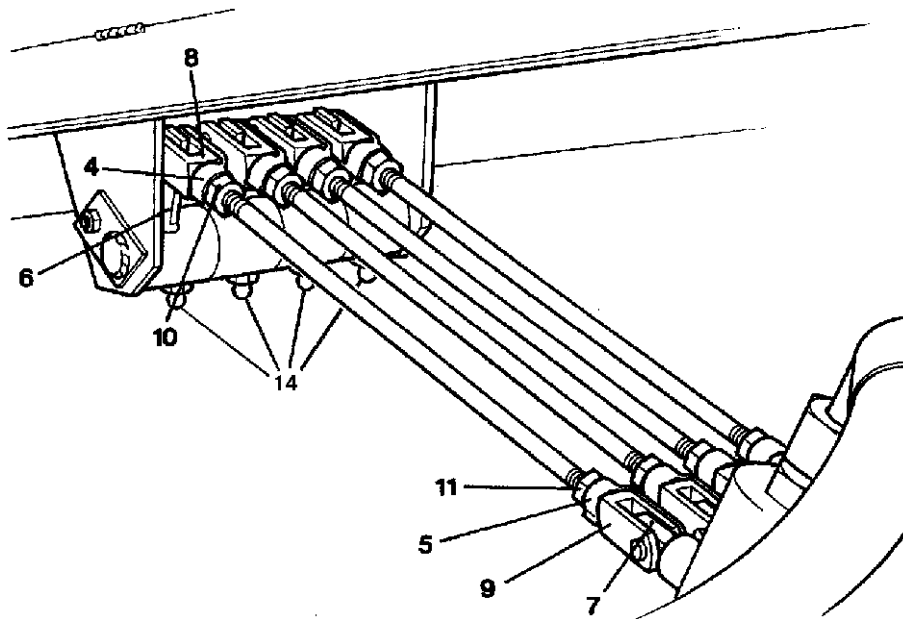


Fig 2.

Removal and Replacement

The removal/replacement procedure is identical for all the external hydraulic control valve linkages.

Removal

Set cab control lever **1** to the neutral position and lock by pressing locking collar **2** down into the locking hole **3**.

Unlock and remove clevis retaining pins **4** and **5** from the ends of the control rod and remove the rod.

Replacement

Set cab control lever **1** to the neutral position and lock by pressing locking collar **2** down into the locking hole **3**.

Loosely assemble the control rod, ensuring that each clevis is screwed onto the rod so that the rod end is just visible in the clevis opening.

Measure the distance between cab control actuating lever **6** and spool eye end **7**. Adjust the length of the control rod to the above measurement, clevis to clevis, by screwing the clevis ends in or out. Adjustment should always be achieved equally between the clevis ends to ensure that enough rod thread remains in each clevis.

Connect clevis **8** to cab actuating lever **6** using clevis retaining pin **4**. Connect clevis **9** to spool eye end **7** using clevis retaining pin **5**, making sure that the flat of spool eye end **7** is vertical when finally set-up. Adjust the clevis in or out to ensure the correct fit. Tighten clevis lock nuts **10** and **11**.

Grease at points **14** after assembly or if the levers become stiff or difficult to operate independently.

Check the operation of the controls as follows:

2 Spool Layout (Spool I), 4 Spool Layout (Spools I and II)

Each 3-position control lever has one forward detent and one rear detent.

Lift the locking collar **2** of lever **1** and lock the collar in the operating position.

Move the control lever to the forward detent and release. The lever should remain in that position. Move the lever to the rear detent position and release. The lever should

remain in that position. Return the lever to the neutral position and lock the lever using the locking collar **2**.

Repeat for lever **II** (4 Spool layout only).

2 Spool Layout (Spool II), 4 Spool Layout (Spools III and IIII)

Each lever has two detent positions when moved forward and one when moved to the rear.

In turn, lift the locking collar **2** of each lever and lock the collar in the operating position.

Move the control lever forward to each of the detents, releasing the lever at each position. The lever should remain in that position. Move the lever to the rear detent position and release. The lever should remain in that position. Return the lever to the neutral position and lock using the locking collar **2**.

Flow Control Linkages

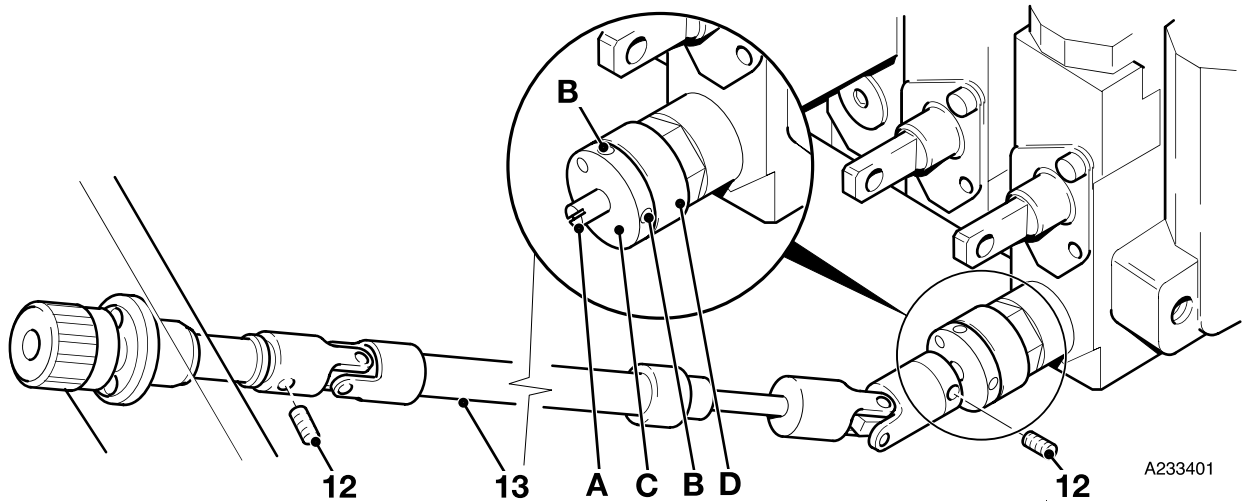


Fig 3.

Removal

Loosen the grub screws **12** to release the telescopic rod **13** from both the control valve and the cab control. Retract the rod and lift clear.

Replacement

Replacement is the reverse of the removal procedure.

When the telescopic rod has been installed, fit a control knob to the in-cab control and wind it clockwise to the limit of its travel. Remove the knob and reposition it so that the lowest knob graduation mark 1 is in the vertical position. Verify correct knob positioning by winding it fully anti-clockwise. The highest knob graduation mark 10 should be in the vertical position.

Testing

Fit a flow meter to the quick release coupling for the spool concerned. With the in-cab knob turned to '10' and the engine running at maximum speed, a flow of 40 litres/min. should be recorded. If the required flow cannot be achieved → [Setting Flow Control \(D-4\)](#).

Setting Flow Control

- 1 Disconnect the lower end of the telescopic rod **13** to reveal the slotted end of spindle **A**.

- 2 Loosen the two grub screws **B** securing collar **C**.
- 3 With a flow meter set up → [Testing \(D-4\)](#), adjust spindle **A** with a screwdriver until the meter records a flow of 40 litres/min.
- 4 Whilst holding it against collar **D**, rotate collar **C** anti-clockwise until it stops and then tighten grub screws **B**.
- 5 Reconnect the telescopic rod → [Replacement \(D-4\)](#)

Power Take-off (PTO)

Speed Selector Cable

Removal and Replacement

Removal

⇒ [Fig 4. \(D-6\)](#)

Ensure that the gearbox is in neutral and that power take-off selector lever **1** is in the central position.

At the gearbox end of the cable, slacken lock nut **2** and slide it back onto the cable.

Remove the two housing retaining bolts **3** and slide housing **4** back onto the cable.

Remove split pin **5** and clevis retaining pin **6**.

Disconnect the electrical connectors from lever position switches **X** and **Y** making a note of their mating connectors.

In the cab, remove four mounting plate securing screws **7** and withdraw the whole selector lever assembly and cable.

Slacken lock nuts **8** and **9**.

Unlock and remove clevis retaining pin **10** and disconnect clevis **11** from actuator lever **12**.

Slacken clevis lock nut **13**. Remove and retain clevis **11** and retaining pin **10**.

Replacement

Slacken lock nuts **8** and **9** and screw them apart. Push the cable into the mounting bracket opening **14**.

Screw clevis **11** onto the cable end until the thread just appears in the clevis opening. Tighten lock nut **13**.

Connect clevis **11** to actuating lever **12** using retaining pin **10** and lock.

Pass the power take-off housing end of the cable through the hole in the control box wall and down to the gearbox.

At the gearbox, check that the selector control rod **15** protrudes approximately 74 mm from the gearbox (measured from the gearbox face to the rod hole centre). If the dimension is incorrect, push or pull the rod to achieve the dimension.

Slacken lock nut **2** and slide it back onto the cable. Also slide housing **4** back onto the cable.

Check that collar **16** is screwed onto the threaded cable outer with approximately one thread showing.

Connect clevis **17** to selector control **15** with retaining pin **6**. Secure using split pin **5**.

Slide housing **4** back over the clevis to mount onto the gearbox. Secure the housing with retaining bolts **3**. Tighten lock nut **2**.

Adjust lock nuts **8** and **9** so that selector lever **1** is in the central position. Reconnect the electrical connectors from lever position switches **X** and **Y** making sure they return to the locations from which they were removed.

Switch the ignition On but do not start the engine. Turn switch **B** ⇒ [Fig 5. \(D-7\)](#) to drive position **D** and check the 540 and 1000 PTO symbols on the instrument cluster are not illuminated. If either is illuminated re-adjust lock nuts **8** and **9** until neither is lit. Switch the ignition OFF.

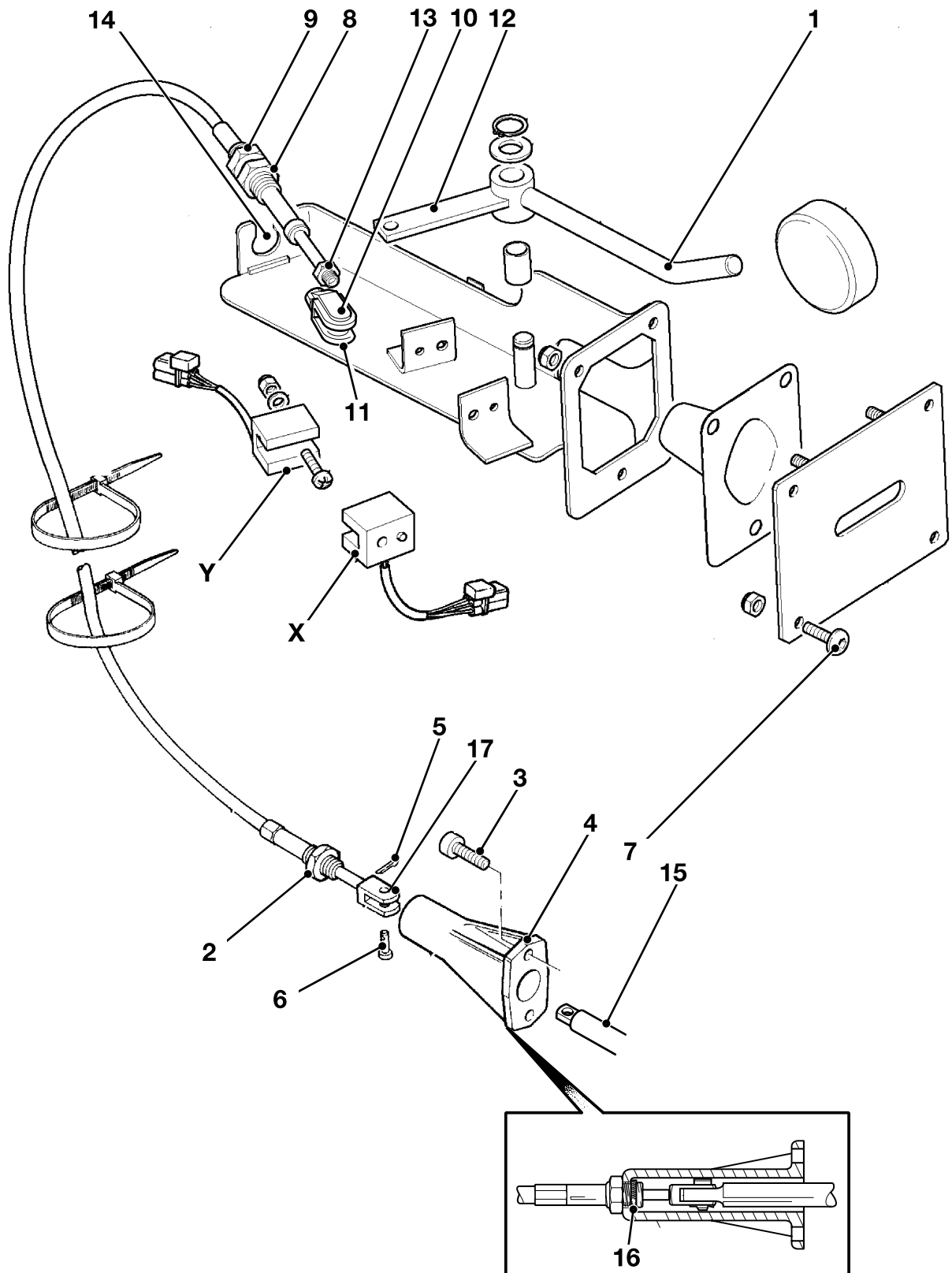


Fig 4.

follows:

Checking

Check the operation of the power take-off (PTO) control as

With the engine stopped, move selector lever **1** to select the slower PTO speed. Do not force the lever if the gear will not engage. Turn the engine over on the starter, switch off and attempt to select the required PTO speed.

With the PTO switch in the brake position **E**, start the engine.

With the engine at tickover to protect the clutch and driveline, check that the rear PTO shaft is not rotating.

Engage the PTO by turning switch **B** to the drive position **D**.

Check that the rear PTO shaft is rotating and that only the 540 PTO lamp is illuminated.

Return switch **B** to the neutral position **C** and stop the engine.

Move selector lever **1** to select the faster PTO speed and repeat the above procedure this time checking that only the 1000 rpm lamp is illuminated.

Note: A detent should be felt in all three selector lever positions. Selector lever **1** travel is 32mm in each direction from the centre.

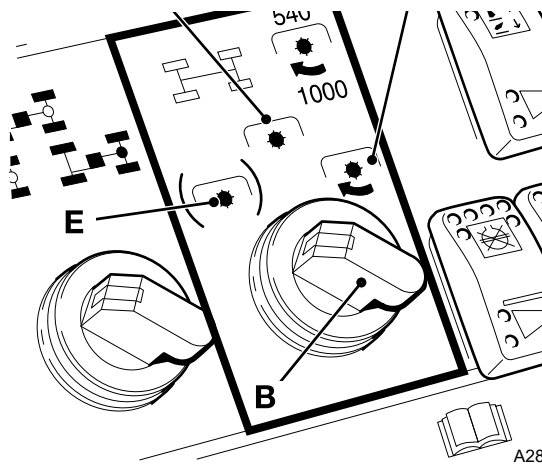
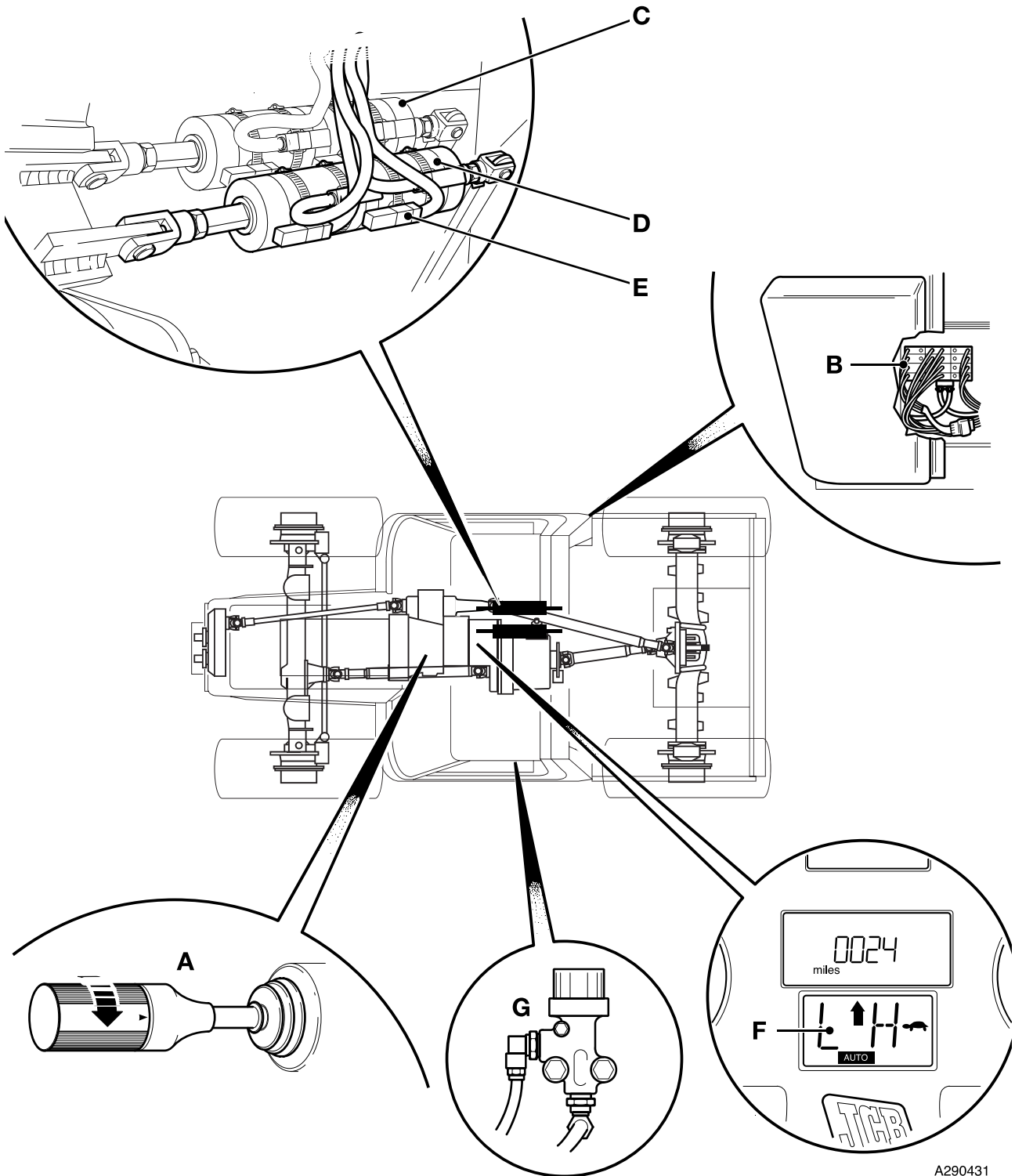


Fig 5.

A28

JCB Selectronic

System Description



A290431

Fig 6.

'JCB Selectronic' is an electro/pneumatic range change system. The system utilises a column selector switch to operate the range gearbox for the selection of High, Low, Medium ranges and Reverse. Operation is by means of solenoid valves which operate pneumatic cylinders. Lever arms connected to the cylinder piston rods operate selector forks in the range gearbox.

The JCB Selectronic system is primarily designed to reduce driver fatigue. Other features include a pre-select facility to improve operational performance, and additional safety features.

The control system inhibits range and direction selection until the speed falls below 3 km/h and the clutch pedal is operated. This enables the driver to pre-select the next range/direction required and, when the speed has fallen below 3 km/h, operate the clutch pedal to make the range/direction change.

If the range fails to engage when selected, either because of driver error or gears baulking, the system prevents the range engaging unexpectedly when the fault subsequently clears. This is because the driver is required to press the clutch pedal again before the change is made. This ensures that the machine cannot move off unexpectedly with the driver out of position in the event of a fault suddenly clearing and gears engaging. Whenever the column-mounted selector switch is put into neutral and speed is below 1 km/h, both splitters and range box will be put into neutral.

The JCB Selectronic system comprises the following components:

Selector Switch

The selector switch **A**, is column mounted, selects high, low, medium, forward, reverse and neutral.

Solenoid Valves

The solenoid valves are energised by relays in sequence depending on the range/direction selected. The four solenoid valves each operate one of four pneumatic cylinders. The valves are mounted on a manifold block below the battery box.

Solenoid valve 1 operates reverse gear

Solenoid valve 2 operates low range

Solenoid valve 3 operates medium range

Solenoid valve 4 operates high range.

Pneumatic Cylinders

Two pairs of cylinders, mounted back to back actuate lever arms on the range gearbox turret. The levers operate selector forks in the range gearbox and select the required range and direction.

The cylinders are mounted on the transmission cross member. One of each pair of piston rods is attached to the cross member.

Cylinder Configuration

C Reverse/Low

D Medium/High

Microswitches

Two microswitches **E** are mounted on each cylinder. The switches are reed type switches whose contacts are closed by the proximity of the cylinder piston head. When the piston operates, one microswitch contact opens, disabling the other pair of cylinders. The other microswitch contacts close, switching its corresponding indicator lamp. Operation of this microswitch only occurs when the piston is at full stroke.

Indicators

Visual Indicators

The centre display **F** of the dashboard instrument cluster shows, from right to left, the splitter clutch engaged, the Selectronic range currently selected, the direction of travel and, if applicable, the Selectronic range pre-selected in readiness for the next range change. For example, item **F** on the illustration indicates that the medium (Tortoise icon)

splitter clutch is engaged, the Selectronic 'high' forward range is selected and the 'low' forward range has been pre-selected.

The range selected indications are initiated by microswitches mounted on the range change cylinders. A 'gear selected' indication is displayed only when the appropriate cylinder has fully operated, and not at the time of selection.

Audible Indicator

In strong sunlight the Instrument Cluster may not be clearly visible. Each time a range is selected, a buzzer is energised and an audible tone sounds in the cab. The audible tone does not sound when Neutral is selected.

Pressure Regulator

Air for pneumatic operation is taken from port 24 of the circuit protection valve and is fed to a pressure regulator **G** which maintains the air shift system pressure.

See Technical Data for the pressure setting.

Operation

General

The JCB Selectronic range change is controlled by a lever mounted switch on the left hand side of the steering column.

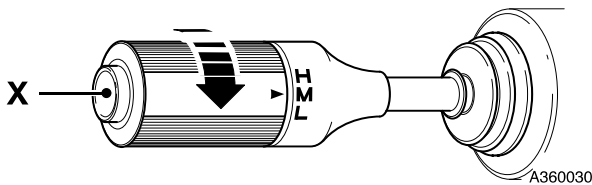


Fig 7.

The rotary section of the column selector switch selects high, low or medium range. Forward is selected by moving the lever forward, reverse is selected by moving the lever back. Neutral is selected with the lever centralised.

Before range or direction can be changed the speed must be below 3 km/h and only then if the clutch pedal is pressed. This arrangement allows a range or direction to be pre-selected, with the change made only when these conditions are met.

Every time the clutch pedal is pressed, drive is disconnected from the transmission at the splitter gearbox. When the range or direction is changed, drive can only be re-connected if the range/direction gears are properly engaged. If not properly engaged, the splitter gearbox clutch is prevented from engaging and resuming drive. [⇒ Electrical/Pneumatic Circuit Description \(□ D-14\).](#)

When the JCB Selectronic range change is in neutral (N) the centre display of the instrument cluster [⇒ Indicators \(□ D-9\)](#) indicates as shown [⇒ Fig 8. \(□ D-11\).](#)

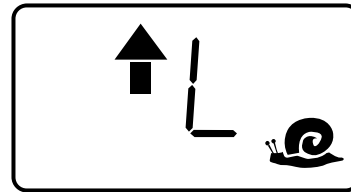


Fig 8.

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Selecting a Forward Range

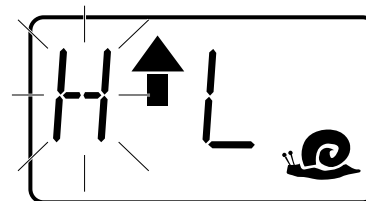
To select a forward range when at rest, depress the clutch pedal fully, lift the switch lever towards the steering wheel and move it forward to position F. The range selected on the lever switch will be shown on the gear display. A typical example, Low range in the slow (snail) Powersplit ratio, is shown in *** " on page 11 ***. A buzzer sounds to indicate that the gear has been selected. release the clutch pedal and drive off.



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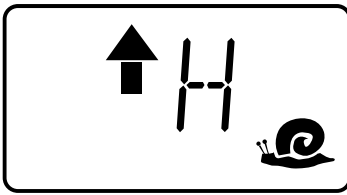
Fig 9.

To change range whilst travelling forward, rotate the barrel of the switch to the desired setting L, M or H. The gear display will continue to show the range already engaged plus a flashing icon to show the new pre-selected range e.g. H [⇒ Fig 11. \(□ D-12\).](#) The range change will not take place until the clutch has been fully depressed and the machine has slowed to 3 km/h. The buzzer indicates completion of the shift and the gear display indicates the range selected (H). Release the clutch pedal to complete the range change.



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Fig 10.

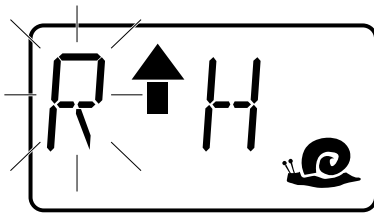


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Fig 11.

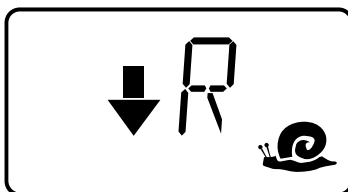
Selecting Reverse Range

To select reverse from forward range, pull the lever backwards into the N (neutral) position and then, whilst holding it up towards the steering wheel, move it to position R. The gear display will continue to show the range already engaged (H) plus a flashing icon R to show that reverse range has been selected. The change will not take place until the clutch has been fully depressed and the machine has slowed to 3 km/h. The buzzer indicates completion of the shift and the gear display indicates the range selected (R) ⇒ [Fig 13. \(□ D-12\)](#). If a forward range different from the previous one is then required, rotate the switch barrel to the appropriate position before re-selecting forward.



A286450

Fig 12.



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Fig 13.

Auto-shuttle

Auto-shuttle provides an alternative method, which does not involve depression of the clutch pedal, of changing from forward movement to reverse movement, or vice-versa. With this mode selected the machine cannot be moved from rest and changes between forward ranges cannot be implemented.

If, at any time during an Auto-shuttle sequence, the clutch pedal is fully depressed, Auto-shuttle is disabled and control of pre-selected range changes reverts to the clutch pedal.

The following full description deals with changing from forward movement to reverse movement.

Carry out **Selecting Reverse Range** to the point where the flashing icon R is displayed ⇒ [Selecting Reverse Range \(□ D-12\)](#).

WARNING

When the Autosshuttle has been engaged and the tractor is slowing down to below 3 kph, there is no transmission or engine braking.

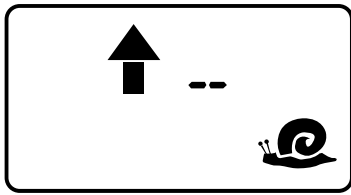
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Once the machine speed falls below 20 kph press button **X** on the end of the range change switch, ⇒ [Fig 7. \(□ D-11\)](#), to select Auto-shuttle. This disconnects all the range change clutches so that no engine braking is available. Using the foot brake if necessary, reduce the machine speed to 3 km/h to activate Auto-shuttle. Reverse gear is selected followed by switch main clutch engagement. As the clutch engages the machine stops and begins to reverse.

To change from reverse movement to forward movement, select a forward range using the range change switch (see [Selecting a Forward Range](#)). If too high a forward range is selected the engine may stall. Select Auto-shuttle and proceed as above.

Invalid or Incomplete Range Changes

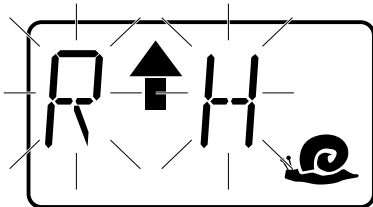
If an invalid gear has been selected by the Selectronic air cylinders, e.g. if one of the microswitches is faulty or if a gear change was not made soon enough to engage, the gear display indicates a double dash, ⇒ [Fig 14. \(□ D-13\)](#).



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Fig 14.

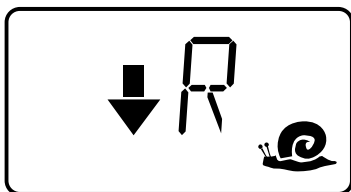
If the operator releases the clutch pedal before a range change has been completed (as indicated by a 'beep' from the buzzer) the transmission adopts a 'neutral dump state'. This holds the Powersplit gears in neutral to prevent transmission damage. If this happens the gear display right hand indication flashes to show the range box status and the left hand indicator flashes to show the pre-selected range, ⇒ [Fig 15. \(□ D-13\)](#).



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Fig 15.

To resume normal operation press the clutch pedal fully down until the buzzer sounds. The pre-select indication should extinguish and the range selected indication should show the new range, ⇒ [Fig 16. \(□ D-13\)](#).



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Fig 16.

Electrical/Pneumatic Circuit Description

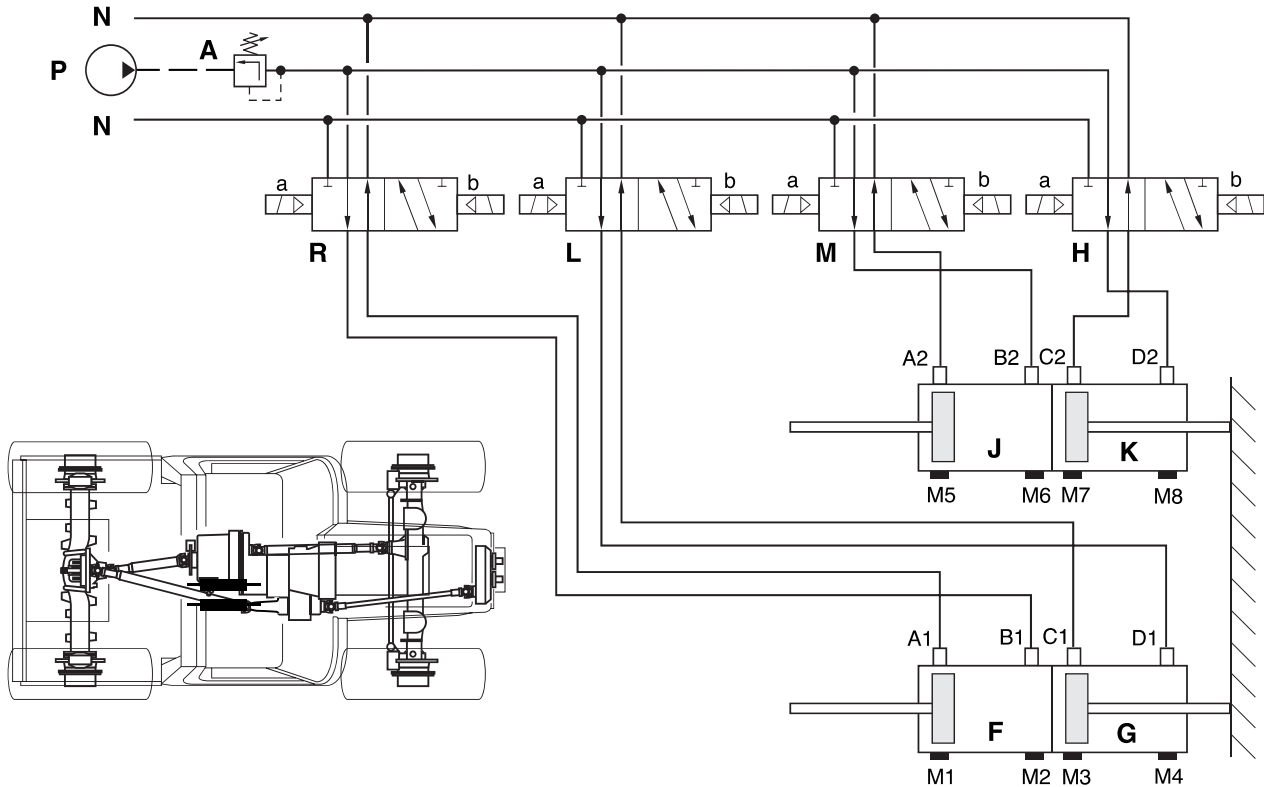


Fig 17.

Component Key

A	Pressure Regulator
F	Reverse cylinder
G	Low range cylinder
H	High solenoid
J	Medium range cylinder
K	High range cylinder
L	Low solenoid
M	Medium solenoid
N	Exhaust
P	Compressor
R	Reverse solenoid

Compressed air from compressor **P** is fed to the pressure regulator **A**. When range selection has been made, the appropriate solenoid valve is energised to direct air to the cylinder required. The piston operates, actuating levers

and selecting the required range. Air exhausts back through the solenoid valve and out to atmosphere beneath the cab.

The system is electrically configured so that if either the LOW or REVERSE cylinders are operated, microswitch contacts open, preventing the operation of the HIGH or MEDIUM range cylinders. Similarly, if either the HIGH or MEDIUM range cylinders are operated, the LOW and REVERSE cylinders are disabled.

Neutral (View V)

With 'NEUTRAL' selected, solenoids Ra, La, Ma and Ha are energised when the clutch pedal is pressed. This feeds air at 7 bar to port B1 on the reverse cylinder, port D1 on the low cylinder, port B2 on the medium cylinder and port D2 on the high cylinder. When neutral gear is selected, the pistons are as shown.

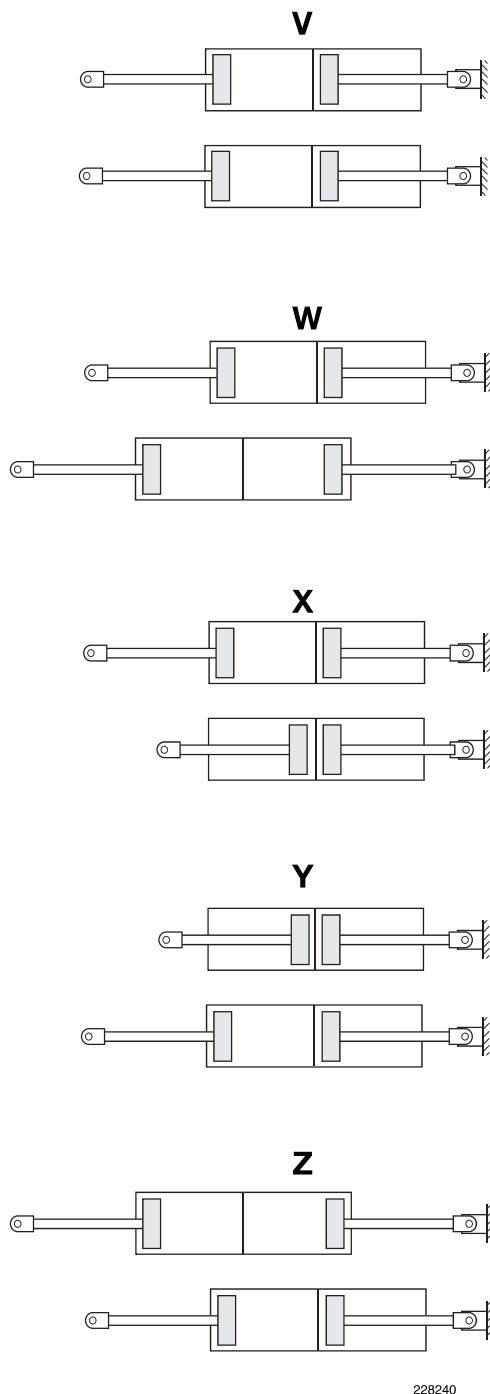


Fig 18.

Low Range Selected (View W)

When the rotary switch is switched to the 'LOW' 'FORWARD' range position, the Low relay is energised (if machine speed is less than 3 km/h and the clutch pedal is pressed). This in turn de-energises solenoid La and energises solenoid Lb. Air at 7 bar is fed to port C1 of the LOW cylinder. The cylinder extends and air from the rod side is vented to atmosphere via the solenoid valve. When the cylinder is fully extended, low range is selected. The piston causes microswitch M4 contacts to close, providing a circuit for the LOW indicator light which illuminates. Microswitch M3 contacts break, preventing the medium and high solenoids from operating.

Reverse Selected (View X)

When 'REVERSE' is selected on the lever, with the rotary switch in any position, the reverse relay is energised (machine speed less than 3 km/h, clutch pedal pressed). Solenoid Ra is de-energised, solenoid Rb is energised. Air at 7 bar is fed to port A1 of the reverse cylinder. The cylinder retracts, venting air from the head side via the solenoid valve. When fully retracted, reverse range is selected. Microswitch contacts M2 close illuminating the REVERSE indicator light. Microswitch M1 contacts break, preventing the medium and high solenoids from operating.

Medium Range Selected (View Y)

When the rotary switch is switched to the 'MED' 'FORWARD' range position, the medium relay is energised (machine speed less than 3 km/h, clutch pedal pressed). Solenoid Ma is de-energised, solenoid Mb is energised. Air at 7 bar is fed to port A2 of the medium cylinder. The cylinder retracts, venting air from the head side via the solenoid valve. When fully retracted medium range is selected. Microswitch contacts M6 close, illuminating the MEDIUM indicator light. Microswitch M5 contacts break, preventing the low and reverse solenoids from operating.

High Range Selected (View Z)

When the rotary switch is switched to the 'HIGH' 'FORWARD' range position, the high relay is energised (machine speed less than 3 km/h, clutch pedal pressed). Solenoid Ha is de-energised, solenoid Hb is energised. Air at 7 bar is fed to port C2 of the high cylinder. The cylinder extends, venting air from the rod side via the solenoid valve. When fully extended, high range is selected. Microswitch contacts M8 close, illuminating the HIGH indicator light. Microswitch M7 contacts break, preventing the low and reverse solenoids from operating.

Limp Home Mode

In circumstances where it is not possible to select the required range due to serious Selectronic ram switch failure, 'Limp Home Mode' can be used. Selection of this mode enables the machine to be moved to a location suitable for repairs to be carried out or for the machine to be loaded onto a trailer. Either 'forward low' or 'reverse' gear can be selected by bypassing the ram switches to power the solenoids directly.

Important: 'LIMP HOME MODE' IS ONLY FOR USE IN EMERGENCY SITUATIONS SO THAT THE TRACTOR CAN BE MOVED FOR REPAIR. IT IS NOT INTENDED FOR NORMAL USE.

To select 'Limp Home Mode' proceed as follows:

- 1 With the tractor stationary and the engine running, select the neutral range **N** on column switch **A**.
- 2 Simultaneously hold down the Powershift 'upshift' **B** and 'downshift' **C** buttons on the speed box lever and fully depress the clutch pedal. The EMS displays 'LIMP HOME'. Release the 'upshift' **B** and 'downshift' **C** buttons.
- 3 Select the required gear, **F** (forward/low) or **R** (reverse), using column switch **A**.

Note: In this mode, when forward gear is selected the range box always defaults to 'low' irrespective of the setting of the range select switch.

- 4 Select a suitable gear in the speed gearbox. Release the clutch pedal.

Normal drive is established as selected at step 5.

Note: During the course of moving the machine, every time the clutch is depressed the 'Limp Home Mode' is automatically de-selected. Therefore the selection procedure must be repeated from step 1 before movement can be continued.

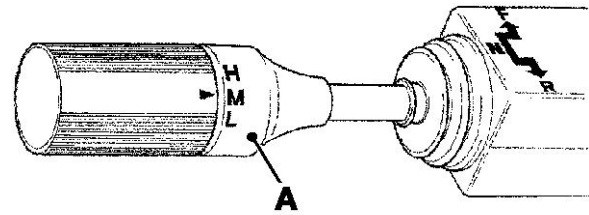


Fig 19.

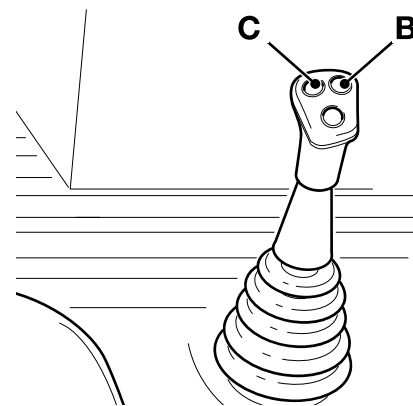


Fig 20.



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Fig 21.

Pneumatic Cylinders

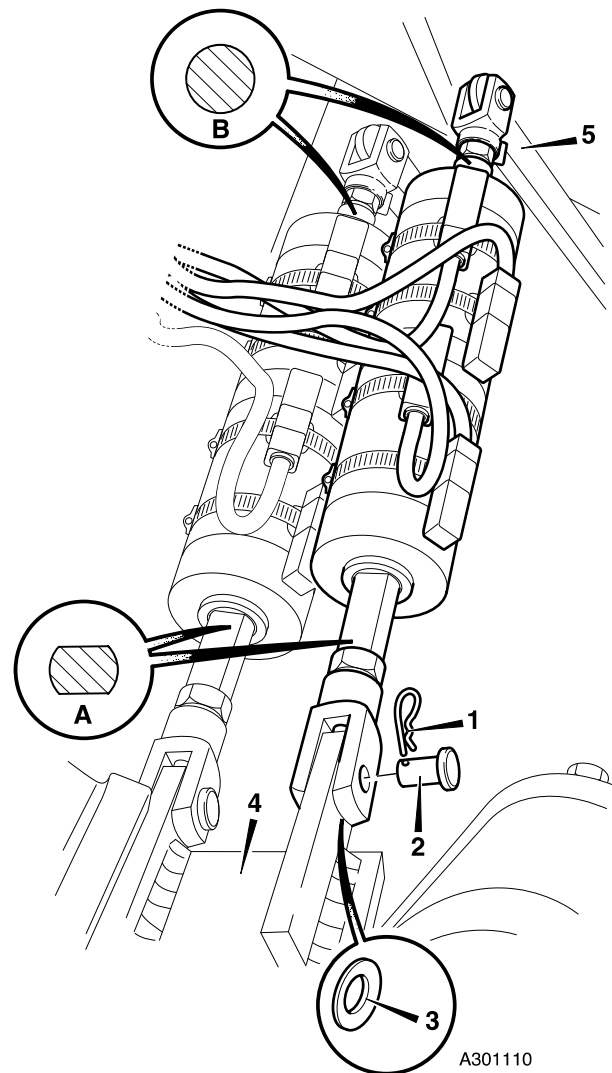
Removal

WARNING

Make the machine safe before getting beneath it. Park the machine on level ground and lower the attachments. Stop the engine and remove the starter key. Make sure the park brake is engaged. Disconnect the battery to prevent the engine being started. Block all four wheels before getting under the machine.

3-3-1-1

- 1 Make sure that all residual air pressure is vented.
- 2 Separate the cylinder assembly electrical connector and note its mating connector.
- 3 Label all air connections (not illustrated) for reassembly. Remove air pipework by pushing the pipe in, then pushing the collet in and removing the pipe whilst holding the collet in.
- 4 Note the orientation of the cylinder. The piston rods at the fixed end of the cylinder have a non-rotating section as shown in view **A**. The piston rods at the lever arm end have a circular section as shown in view **B**.
- 5 From each end of the cylinder remove R-clip **1**, pin **2** and anti-vibration washer **3**. Remove the cylinder from the vehicle.
- 6 Renew faulty microswitch and/or set the switch positions [⇒ Setting Microswitch Positions \(□ D-19\)](#).



A301110

Fig 22.

Replacement

Before fitting the cylinder check and adjust microswitch positions as required, [⇒ Setting Microswitch Positions \(□ D-19\)](#) and if appropriate, set the range gearbox turret stops, [⇒ Setting Range Gearbox Turret Stops \(□ D-18\)](#).

- 1 Position the cylinder between cross-member bracket **4** and lever arm **5**, making sure the non-rotating piston rod is attached to the cross-member bracket. Fit the pins **2**, anti-vibration washers **3** and R-clips **1**.

- 2 Refit the air pipework connectors by pushing them firmly and squarely into the correct fittings.
- 3 Re-connect the cylinder assembly electrical connector.
- 4 Make sure the air pipework and electrical cables are correctly routed and cannot foul the lever arms when the pistons are operated.

- 5 Re-set the neutral rod lengths, ⇒ [Setting Cylinder Rod Neutral Lengths \(□ D-18\)](#).

Renewing Microswitches

Remove the two connector pins of the faulty microswitch from the 8-pin connector which serves the complete set of microswitches. Loosen and release the retaining band and take the microswitch off the cylinder. Install a new microswitch and insert its connector pins into the 8-pin connector. Position the microswitch, ⇒ [Setting Microswitch Positions \(□ D-19\)](#) and secure by means of the retaining band tightened to a torque of 1.7 Nm (15 lbf in).

Setting Up

WARNING

You will be working close into the machine for these jobs. Lower the attachments if possible. Remove the starter key and disconnect the battery. This will prevent the engine being started. Make sure the park brake is engaged.

Block all four wheels before getting under the machine.

2-3-2-1

Setting Range Gearbox Turret Stops

The turret stops are set correctly on manufacture but in the event of turret removal the following procedure must be followed with the rams disconnected from the levers.

- 1 Manually select each gear in turn (one lever approximately 50 mm away from the central position while leaving the other lever in the central position).
- 2 With the relevant locknut 1 slackened off, adjust the screw so that lever play is only just removed. Tighten the locknut. Re-check the play and return the lever to its central position.
- 3 Repeat steps 1 and 2 with each of the three other gears in turn.

Setting Cylinder Rod Neutral Lengths

- 1 Connect the machine battery, turn the starter switch ON and select neutral.

- 2 Selecting neutral should position the piston rods as follows:
 - a Rods connected to control levers fully retracted.
 - b Rods connected to chassis fully extended.
- 3 Ensure that the range gearbox levers are set to NEUTRAL, i.e. both levers in the central position.
- 4 Slacken locknuts 2, adjust clevises 3 so that the clevis pin 4 freely enters the clevis and anti-vibration washer 5. Secure with R-clips 6.

Ensure that each clevis has adequate thread engagement on the piston rod. If necessary this can be compensated by adjusting the rod length on the opposite end of the cylinder.

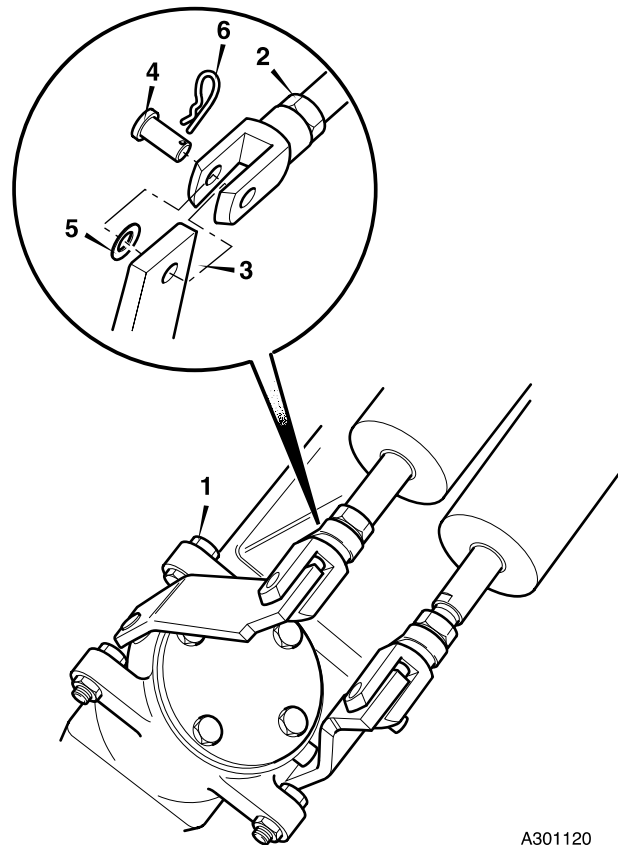


Fig 23.

A301120

Setting Microswitch Positions

CAUTION

DO NOT use a test lamp when checking voltages around the JCB Selectronic circuit. The relatively high current will destroy the logic and range indicator microswitches. Use an Avometer or digital voltmeter.

ELEC-5-1

Setting Neutral Microswitch Positions

The neutral microswitches are numbers **1** and **3** (Medium/High) cylinder and **5** and **7** (Reverse/Low cylinder).

To determine the correct microswitch position, connect a continuity tester across the relevant pins of the connector

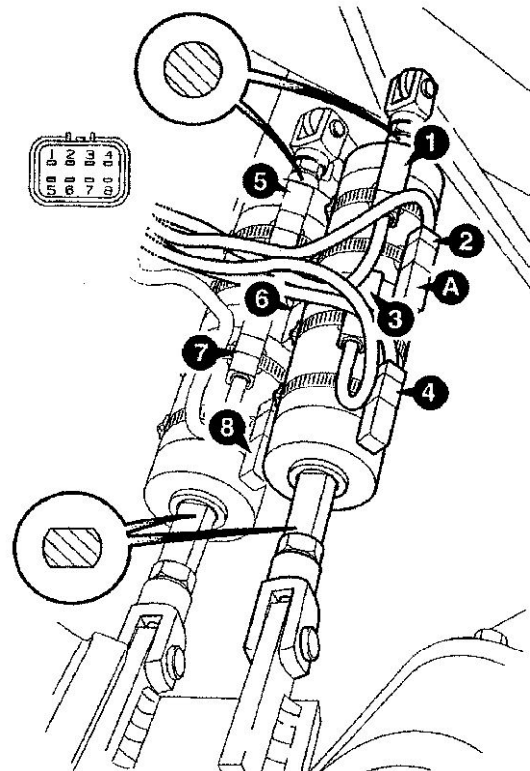
- Switch **1**: Pins 1 and 5
- Switch **3**: Pins 3 and 7
- Switch **5**: Pins 1 and 5
- Switch **7**: Pins 3 and 7

- 1** Ensure that the range gearbox is in neutral, i.e. both levers in the central position.
- 2** With the continuity tester across pins 1 and 5, slacken microswitch **1** retaining band. Move the microswitch to ensure that the switch is located in the centre of its operating band width as follows:

Slide the microswitch towards the rear of the machine and then forward until the tester just shows continuity. Mark the ram cylinder opposite a reference point on the microswitch. Continue to move the switch forwards until continuity is lost. Move the switch rearwards until the tester just shows continuity once again. Mark the ram cylinder opposite the same reference point on the microswitch as previously. Position the microswitch centrally between the two marks.

Note: Do not exceed a torque of 1.7 Nm (15 lbf in) on the retaining band.

- 3** Repeat steps 1 and 2 for microswitches **3**, **5** and **7** connecting the continuity tester to the appropriate pins of the connector.



98/217-1

Setting Gear Engaged Microswitch Positions

The gear engaged microswitches are numbers, **2** and **4** (Medium/High) cylinder and **6** and **8** (Reverse/Low cylinder).

To determine the correct microswitch position, connect a continuity tester across the relevant pins of the connector.

- Switch **2**: Pins 2 and 6
- Switch **4**: Pins 4 and 8
- Switch **6**: Pins 2 and 6
- Switch **8**: Pins 4 and 8

- 1** Start the engine to ensure that the air reservoirs are fully charged. On the speed gearbox select Neutral.
- 2** Switch off the engine and turn the starter switch to IGN. On the range gearbox select medium/forward range and turn the starter switch to O.

- 3 With the continuity tester across pins 2 and 6, slacken microswitch 2 retaining band. Move the microswitch to ensure that the switch is located in the centre of its operating band width as follows:

Slide the microswitch towards the front of the machine and then rearwards until the tester just shows continuity. Mark the ram cylinder opposite a reference point on the microswitch. Continue to move the switch rearwards until continuity is lost. Move the switch forwards until the tester just shows continuity once again. Mark the ram cylinder opposite the same reference point on the microswitch as previously. Position the microswitch centrally between the two marks.

Note: Do not exceed a torque of 1.7 Nm (15 lbf in) on the retaining band.

- 4 Select neutral range and restart the engine to re-charge the air reservoirs.
- 5 Repeat steps 2 to 4 for the remaining microswitches selecting the appropriate range as shown below.

Microswitch 4 High/forward range

Microswitch 6 Reverse range

Microswitch 8 Low/forward range

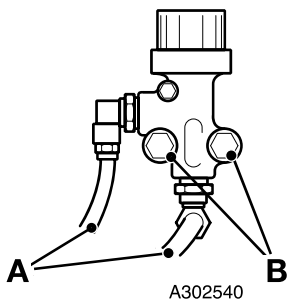
Pressure Regulator

The unit is located in the cab on the left side of the machine, beneath the passenger seat.

Removal

Disconnect the air hoses **A** making a note of the ports from which they were removed.

Remove the two cap screws/washers/nuts **B** and lift the assembly clear.



Replacement

Replacement is the reverse of removal.

Throttle Controls

Field Speed Control

Operation

⚠ WARNING

When driving the machine on the road, use the accelerator pedal and not the hand throttle or Field Speed Control to control the engine speed. Always set the hand throttle to 'idle' and disable the Field Speed Control before road use.

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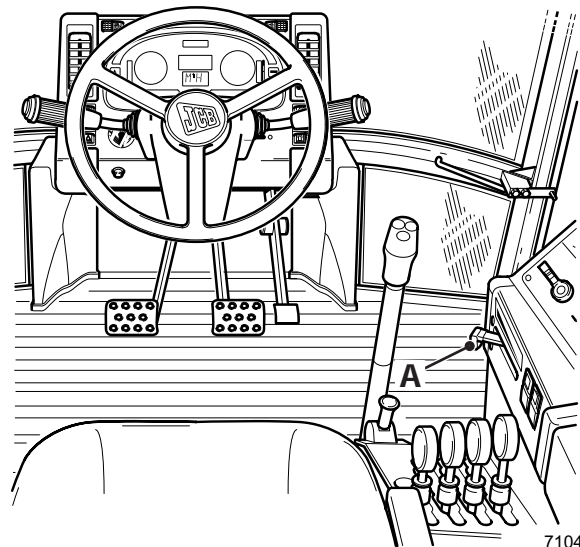
Once it has been set up, the Field Speed Control (FSC) allows the operator to instantly select or deselect an additional preset engine speed.

To set up the required preset speed:

- 1 Start and run the engine until normal operating temperature has been reached.
- 2 Move the hand throttle **A** forward a little from its normal idle position.
- 3 Switch on the FSC enable switch **B**. (The switch lights up when the FSC is enabled.)
- 4 Press increment switch **C** upwards to increase the preset speed or downwards to reduce the preset speed.

You can now toggle between the setting of the hand throttle and the preset FSC setting by using switch **B**.

Note: If the hand throttle is moved back to its normal idle position, the FSC system will be disabled. To re-enable the FSC system, move the hand throttle forward, switch off switch **B** and switch it back on again.



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Fig 24.

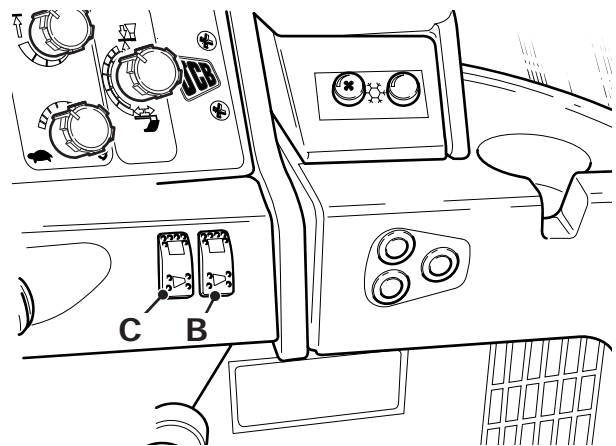


Fig 25.

Adjustment

The field speed control (FSC) must be set as follows so that it is disabled when the hand throttle is set to run the engine below 1000 rpm.

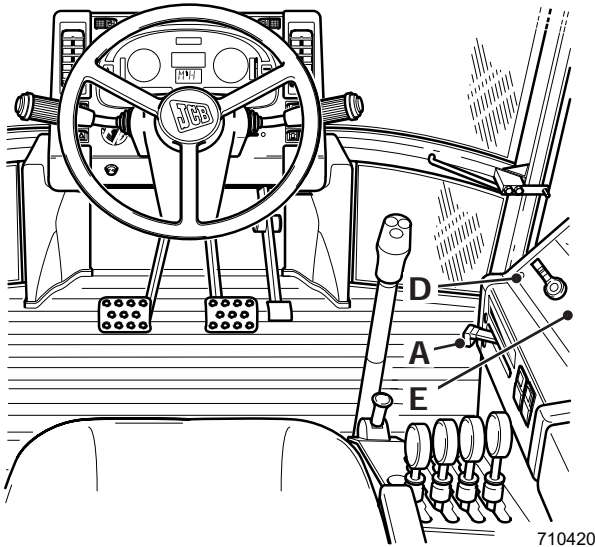


Fig 26.

- 1 With the engine stopped, remove four screws **D**. Lift up and turn over the control panel **E** to gain access to the underside of the hand throttle controls.
- 2 Start the engine and set the hand throttle **A** until an engine speed of 1000 rpm is displayed on the instrument cluster. Make sure the hand throttle does not move and then stop the engine.

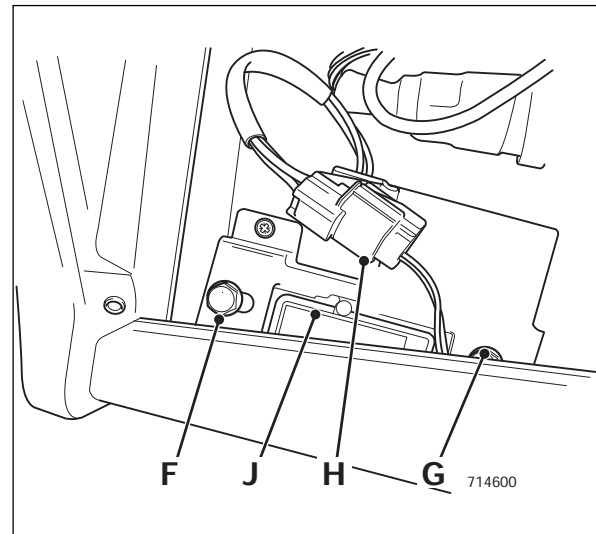


Fig 27.

- 3 Slacken screws **F** and **G**.
- 4 Disconnect plug **H** and using a multimeter, check for continuity between pins 1 and 3 of plug **H**.
- 5 Slide bracket **J** slowly forwards and backwards to find the point at which continuity is made or broken. Tighten screws **F** and **G** with the bracket in this position.
- 6 Start the engine and check the operation of the FSC.
- 7 Stop the engine and refit panel **E**.



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