CLUTCH AND SYNCHRONISER CALIBRATION

The Semi-powershift transmission has 5 clutch packs and 2 synchronisers that require periodic calibration to compensate for wear. Calibration should only be necessary only if a deterioration in gear shift quality is noted.

NOTE: *During the calibration procedure the electronic management system detects precisely the point at which the clutches start to engage . The engagement is detected by a reduction in engine speed. During calibration it is essential that no action is taken to to cause the engine speed to vary. Be sure that the air conditioner and all electrical equipment is switched off. Do not operate the PTO or any hydraulic lever or move the hand or foot throttle.*

There are two methods to enter the calibration mode:
(i) Through the white diagnostic connector, using special tool No. 4FT.950 and menu mode H1, or,
(ii) By depressing both up/down shift buttons together during start up.

Tractor Preparation

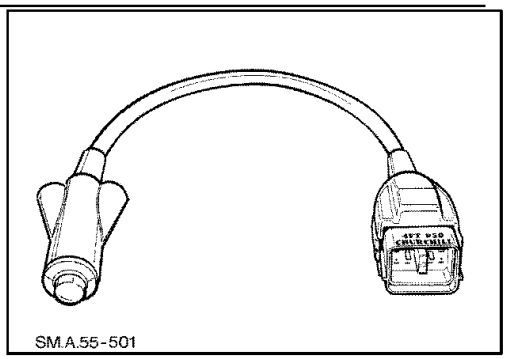
NOTE: *The clutches should be adjusted when the transmission oil temperature is between 20°C (68°F) and 50°C (122°F).*

Park the tractor on level ground, away from obstacles (in case of unexpected tractor movement).

Apply handbrake, switch off all electrical equipment and air conditioning if fitted. Stop the engine and place remote levers in neutral and lower hydraulic equipment to the ground.

Place the shuttle in neutral. Block the wheels, front and rear.

Either, (i) Install tool 4FT.950 into the diagnostic plug or (ii) press and hold both Up/down shift buttons and start the engine. Select H1 by depressing the diagnostic switch once.



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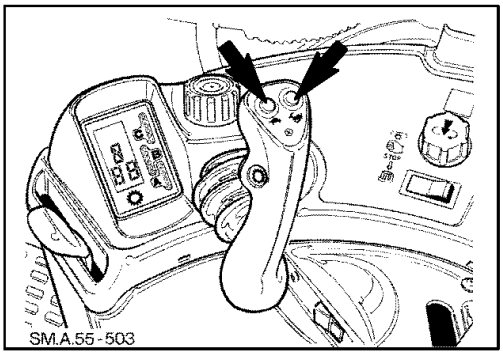

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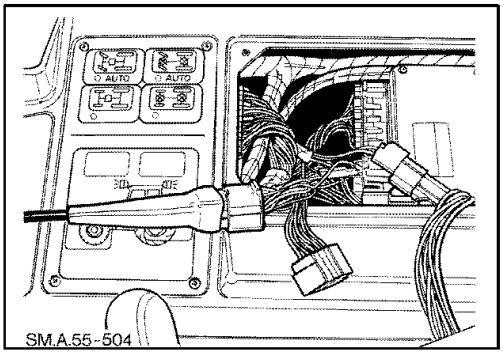

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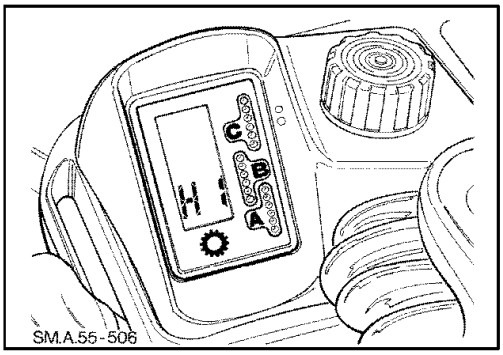

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Release the buttons. The display will change to show transmission temperature. Press the up or downshift button to proceed.

If the temperature is less than 10°C Error Code 'U19' will be displayed. If the temperature is between 10°C and 20°C "CL" will be displayed. If the temperature is to high, above 50°C, "CH" will be displayed.

If 'U19' is displayed calibration will not be possible and the oil will have to be warmed before proceeding.

If 'CL' or 'CH' are displayed after 4 seconds the display will return to oil temperature and the tractor may be operated to obtain the correct transmission oil temperature. If it is not practical to wait for the oil temperature to change press either of the up or down shift buttons while 'CL' or 'CH' is being displayed. The display will then show an 'A' and calibration can proceed.

Move the shuttle lever to forward and release the clutch pedal.

Set engine speed to 1200 ERPM ±100.

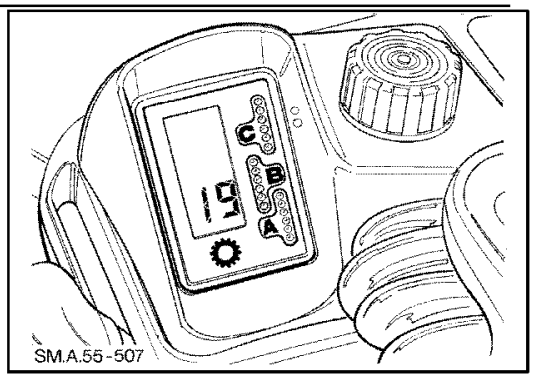
The transmission is now ready for calibration.

Press and hold the downshift button to calibrate clutch A.

If the start up procedure was incorrect a "U" code will appear.

Hold the downshift button until the engine speed decreases by 50 RPM and the calibration number stops increasing.

Release the downshift button, the display will change to 'b', indicating that clutch B is ready for calibration. Hold the downshift button until the engine speed decreases by 50 RPM and the calibration number stops increasing.



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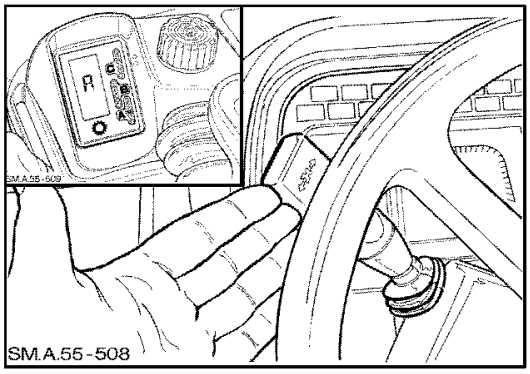

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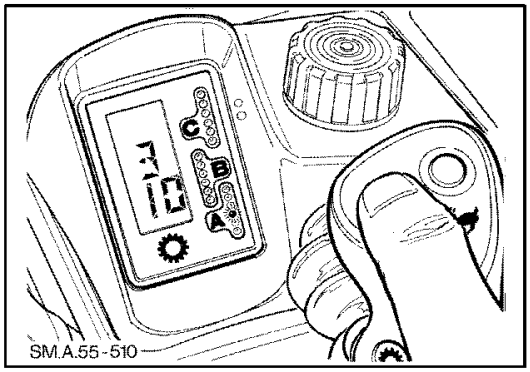

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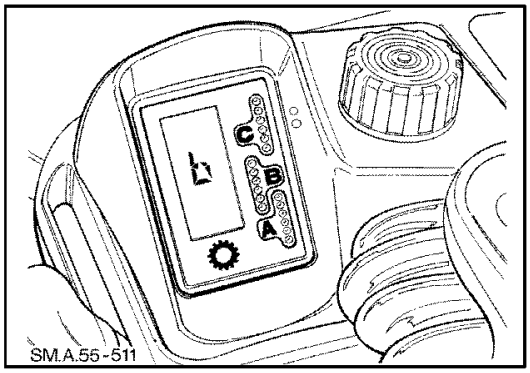

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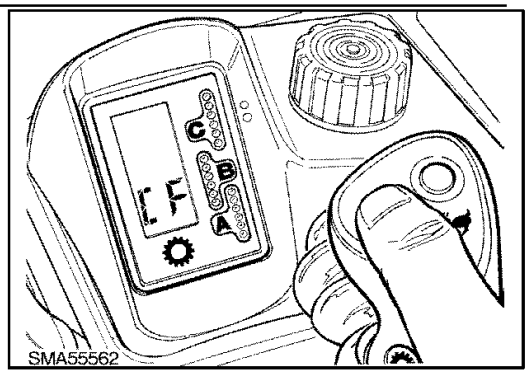
Repeat the above steps for clutches C, D and E. After clutch E has been calibrated, release the downshift button and the display will change to F.



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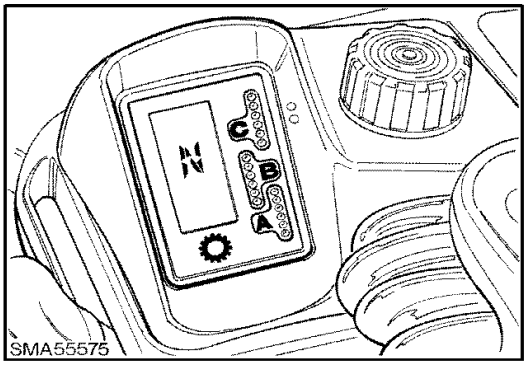
Press the downshift button again. The synchronisers will be shifted to neutral and synchroniser stroke relationship will be checked. If satisfactory the display will show 'CF'.

Pressing the downshift button again will select mode 'N'. This mode engages clutches A and C with the synchronisers in neutral. This can be used to 'free' transmission components that may be suspected of sticking , i.e,synchronisers. It should be noted that if a synchroniser is not actually in neutral, this mode can cause the tractor to move.

When the display alternates between 'N' and '750' this indicates that the mode has completed.



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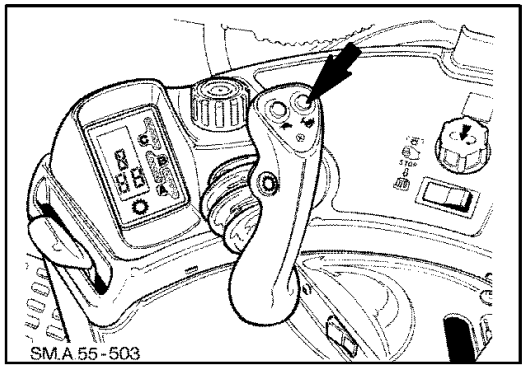
Turn the key start switch off for at least 2 seconds to store the calibration values.

NOTES: *Transmission output speed and clutch pedal position are constantly monitored. Calibration cannot proceed unless the tractor is stationary and the clutch pedal released.*



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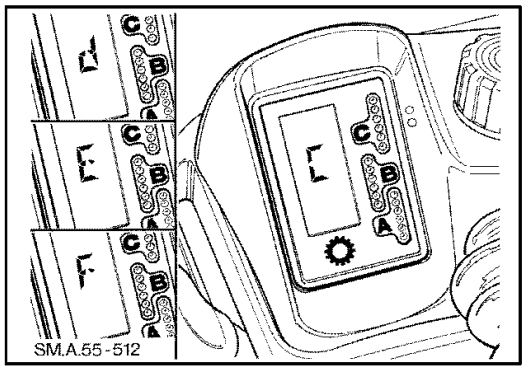
Repeatedly depressing the upshift button will cycle through each clutch mode, enabling a particular clutch to be calibrated several times if required.

During each clutch calibration the synchroniser positions are also calibrated:-

- During Clutch A - Mid range synchroniser calibrated
- During Clutch B - Reverse range synchroniser calibrated
- During Clutch C and D - High range synchroniser calibrated
- During Clutch E - Low range synchroniser calibrated



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CALIBRATION ERRORS AND MESSAGES

U19 – Oil temperature below10_C

Warm oil to above 10°C before processing with calibration.

U21 – Engine RPM too low

Increase engine RPM to 1200 ±100

U22 – Engine RPM too high

Reduce engine RPM to 1200 ± 100

U23 – Shuttle lever is in neutral

Place shuttle lever in forward

U26 – Clutch pedal not released

Release clutch pedal

U31 – Output speed sensed – tractor moving

Ensure handbrake is applied and wheels choked. If error persists check that the Mid and Rear transmission speed sensor connectors are not swapped, if okay then possible mechanical fault within transmission.

U36 – Maximum allowed clutch calibration value exceeded

Current value exceeded without lugging engine down. Possible PWM valve faulty. Low Hydraulic Pressure fault or a faulty synchroniser not transmitting drive.

U37 – Engine RPM dropped too soon

Engine lugged down too soon. Possible PWM fault or mechanical fault within transmission.

CALIBRATION ERRORS AND MESSAGES (Continued)

U81 - No Mid/Reverse synchroniser movement sensed

U82 - No Low/High synchroniser movement sensed

Mechanical fault to synchroniser potentiometer or Low/No Hydraulic Pressure to synchroniser piston. Pressure test - if low pressure, remove and inspect solenoid valve. If pressure good suspect stuck piston - remove side cover and inspect.

U83 - synchroniser potentiometer connectors swapped

Assemble connectors correctly

U84 - Reverse and high synchroniser solenoid connectors swapped

Assemble connectors correctly

U85 - Mid and low synchroniser solenoid connectors swapped

Assemble connectors correctly

U86 - Mid/Reverse synchroniser neutral error

U87 - Low/High synchroniser neutral error

synchroniser NOT in neutral: Enter HL MODE, confirm synchroniser operational if neutral error confirmed suspect mechanical fault with synchroniser. Remove side cover and inspect. With side removed also inspect linkage to potentiometer.

CALIBRATION ERRORS AND MESSAGES (Continued)

U88 – Mid/Reverse synchroniser calibration values out of tolerance

U21 – Low/High synchroniser calibration values out of tolerance

Check potentiometer operation, removed from transmission, if to specification remove side cover and inspect potentiometer linkage.

CF – Calibration procedure completed successfully

CH – Oil temperature above 50_C

Message for information only. Press upshift to proceed.

CL – Oil Temperature between 10 and 20 degrees

Message for information only. Press upshift to proceed.