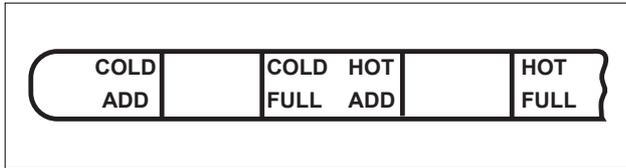


### Checking Oil Level

The dipstick and filler are situated to the left of the engine at the rear.



### Cold Run

1. Park vehicle on level ground and apply parking brake.
2. Run the engine for 1 minute. Select 1st then reverse and finally neutral. Sump temperature should be between 60° - 120°F (16° - 49°C).
3. With engine idling, check level. If the level is not in the cold run band, add or drain as necessary.

### Hot Run

1. Operate transmission in Drive until normal operating temperature is reached.  
 Sump temperature  
 160° - 200°F (71° - 93°C)  
 Converter-out temperature  
 180° - 220°F (82° - 104°C)
2. Park vehicle on level ground select neutral, apply parking brake and allow engine to idle.
3. Check oil level. Add or drain necessary, to bring the level to the top of the HOT run band.
4. Perform final check twice. If readings are inconsistent, check gearbox breather and vent hole in the dipstick.
5. The above operation may be carried out immediately after the use of the vehicle.

**NOTE**

Approximately 1 litre of oil is required to raise the level from the bottom to the top of the hot run band. (Add to full).

### Oil and Filter Change

1. Transmission should be at operating temperature to assist draining.
2. Remove drain plug from oil pan.
3. Remove oil pan, gasket, filter and seal ring. Clean the oil pan.
4. Remove the screen for the governor feed line, located in the control valve body. Clean and replace.
5. Replace new filter and seal ring. Fit oil pan and gasket, tightening the bolts evenly. Replace drain plug and tighten to 15 - 20 lb ft (20 - 27 Nm).
6. Remove external auxiliary oil filter element and replace.

**NOTE**

The oil filter seal should be lightly oiled and at contact with the filter head face, tightening the element 2/3 to one full turn.

7. Refill with new oil, the refill amount is less than the initial fill because some of the oil remains in the internal circuits and transmission cavities.
8. After refill, check the oil level using the above procedure.

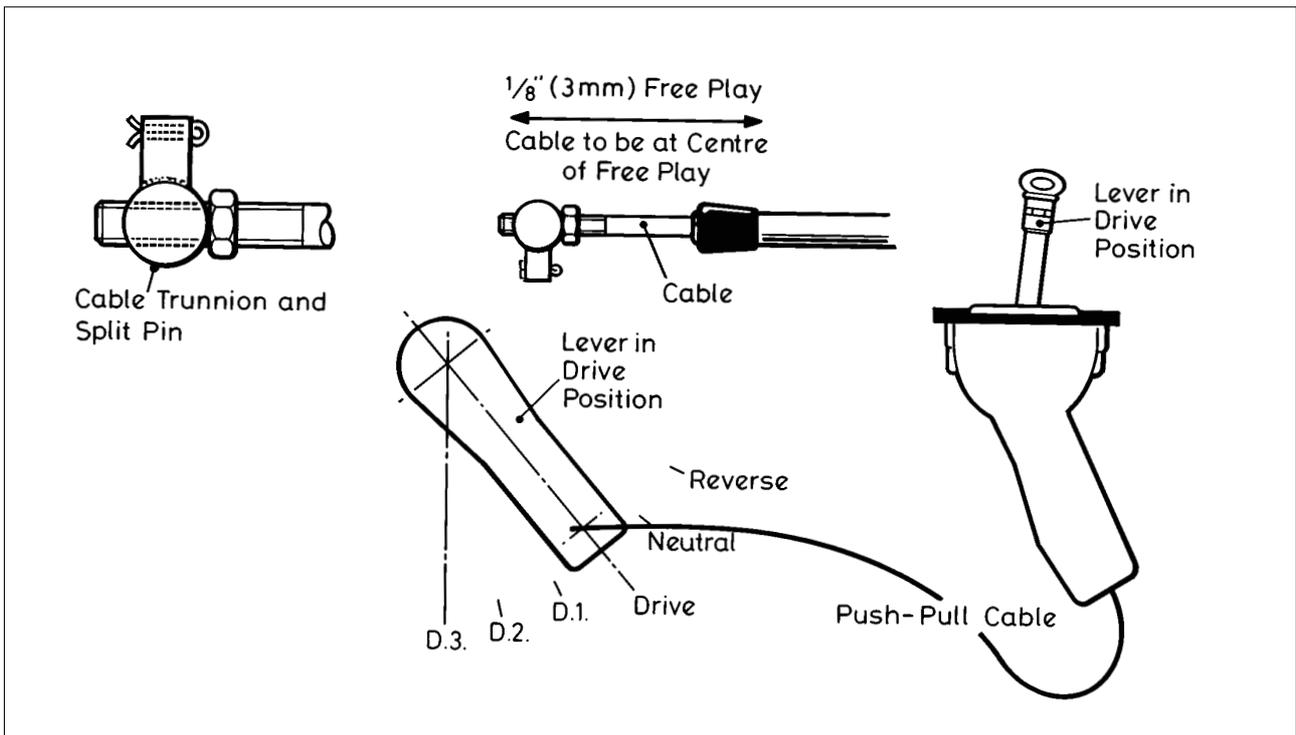
### Gearbox Breather

The breather is located at the top of the transmission housing. It serves to prevent pressure buildup and must be kept clean and the passage open.

### Range Selector Cable Adjustment

To check the correct adjustment of the selector cable, carry out the following procedure:

- Put transmission into drive.
- Remove the split pin from the cable trunnion at the gearbox end of the cable.
- Remove the trunnion from the gearbox selector arm.
- The correct adjustment is when the trunnion is a sliding fit in the gearbox selector arm and the trunnion is at the centre of it's free play in the drive position.
- This step of equalising the free play of the cable before checking the trunnion in the selector arm is most important, and is necessary for trouble free operation.
- Replace the split pin.
- Check all speed ranges (Reverse, Neutral, Drive, 1, 2, and 3) for correct operation.



## Description

The Allison 2000 series is a fully automatic electronically controlled transmission with five forward speeds. The transmission control module (TCM) processes information received from sensors on the transmission and sends signals to activate specific solenoids on the control valve module. The transmission features "adaptive shifting" which helps to optimize shift quality by monitoring critical clutch activation characteristics and making adjustments to improve subsequent changes.

## Specification

Type	..... Allison 2000 series
Gears	..... Five-speed automatic
Retarder	..... External - Telma
Oil capacity	..... 18.9 litres
Oil change	..... 15.0 litres
Oil specification	..... Castrol Transynd
Recommended brand	..... Castrol Transynd (TES295)

## Maintenance

### Change control main oil filter

At first 5,000 miles (8,000km) and then at every 50,000 miles (80,000 km) 2 yearly.

### Change sump filter

At overhaul

### Change oil

☞ Every 50,000 miles (80,000 km) 2 yearly.

### Check adjustment of shift linkage

C service interval

### Check gearbox breather

C service interval

### Check tightness of fixings

First, A, B & C service intervals

### Check for oil leaks and rectify

First, A, B & C service intervals

### Check oil level

First, A, B & C service intervals

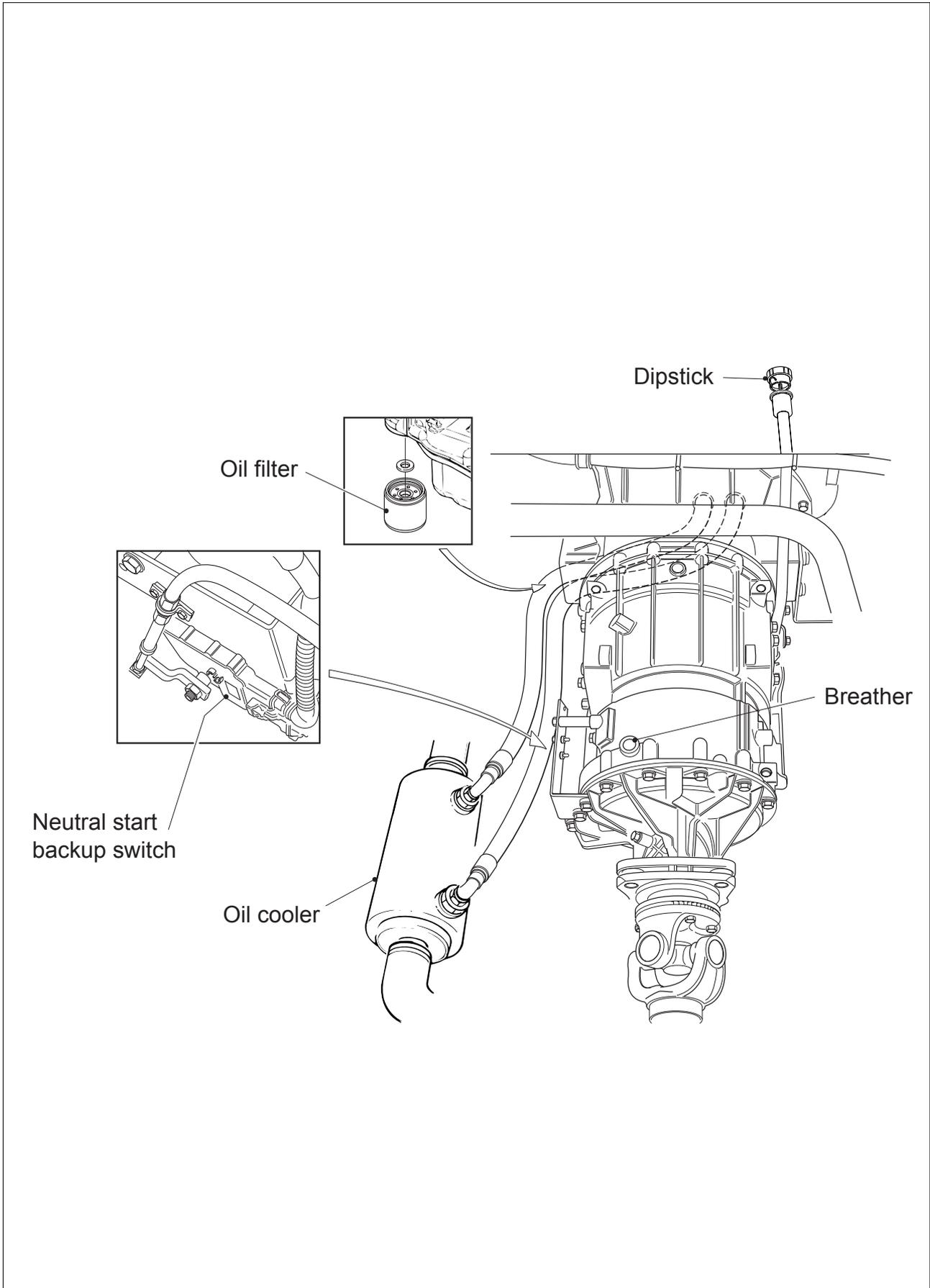
## Service Intervals

First	..... 1,000miles (1,600km)
A service interval	... 6,000miles (10,000km) / 3months *
B service interval	... 12,000miles (20,000km) / 6months *
C service interval	... 24,000miles (40,000km) / 12months *

\* *whichever is sooner*

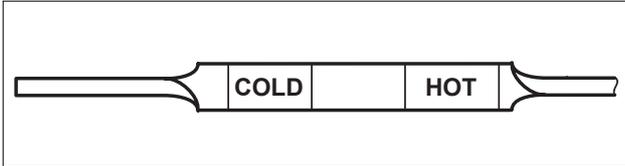
## Torque Settings

Bolt - flexplate to crankshaft	..... 137 Nm (101 lbf.ft)
Bolt - flexplate to attachment ring	... 57 - 68 Nm (42-50 lbf.ft)
Bolt - attachment ring to torque convertor	..... 45 Nm (33 lbf ft)
Setscrew - gearbox to engine	... 51 - 61 Nm (37-44 lbf.ft)
Screw - gearchange cable bracket	..... 23-27 Nm (16-19 lbf.ft)
Bolt - Gearchange cable bracket	..... 51 - 61 Nm (37-44 lbf.ft)
Nut - selector lever	..... 20-27 Nm (14-19 lbf.ft)
Plug - oil drain	..... 30-40 Nm (22-30 lbf.ft)
Nut - dipstick tube mounting	..... 43 Nm (31 lbf.ft)
Gearbox to cooler hose - end fitting 37 deg. 7/8 JIC	.... 48-55 Nm (35-40 ibf ft)
Gearbox to cooler hose - end fitting 37 deg 7/8-12 JIC	... 48-55 Nm (35-40 ibf ft)
Cooler to gearbox hose - end fitting 37 deg 7/8 JIC	..... 48-55 Nm (35-40 ibf ft)
Cooler to gearbox hose - end fitting 7/8-12 JIC	..... 48-55 Nm (35-40 ibf ft)



## Checking Oil Level

The dipstick and filler are situated to the left of the engine at the rear.



### Cold Run

1. Park vehicle on level ground and apply parking brake.
2. Run the engine for 1 minute. Select drive then reverse and finally neutral.
3. With engine idling, check level. If the level is not in the cold run band, add or drain as necessary.

### Hot Run

1. Operate transmission in Drive until normal operating temperature is reached.  
 Sump temperature  
 160° - 200°F (71° - 93°C)  
 Converter-out temperature  
 180° - 220°F (82° - 104°C)
2. Park vehicle on level ground, select neutral, apply parking brake and allow engine to idle.
3. Check oil level. Add or drain necessary, to bring the level to within the HOT run band.
4. Perform final check twice. If readings are inconsistent, check gearbox breather and vent hole in the dipstick.
5. The above operation may be carried out immediately after use of the vehicle.

#### NOTE

The width of the "HOT RUN" band represents approx. 1 litre of fluid at normal operating temperature.

## Oil and Filter Change

1. Transmission should be at operating temperature to assist draining.
2. Remove drain plug from oil pan.
3. Remove the control main filter by unscrewing it anti-clockwise using a strap type filter wrench.
4. Remove the magnet from the filter or attachment tube, clean the magnet and report any large metal particles to the maintenance personnel.
5. Replace the magnet on the attachment tube.
6. Replace the control main filter..

#### NOTE

The oil filter seal should be lightly oiled, and at contact with the filter head face tighten the element 2/3 to one full turn.

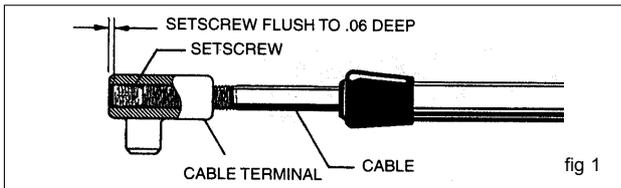
7. Re fit the drain plug and tighten to 30-40 Nm (22-30 lb ft).
8. Refill with new oil, the refill amount is less than the initial fill because some of the oil remains in the internal circuits and transmission cavities.
9. After refill, check the oil level using the above procedure.

## Gearbox Breather

The breather is located at the top left of the transmission main housing. It serves to prevent pressure buildup and must be kept clean and the passage open.

**Change Speed Linkage 6 Position**

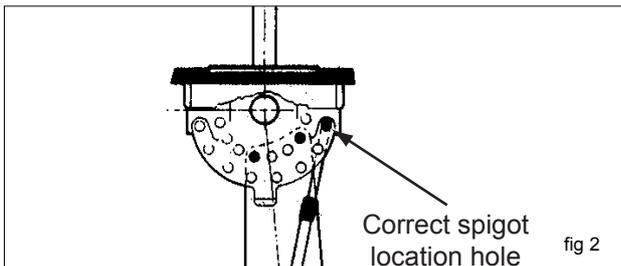
1. If fitting a new cable remove and discard cable nut. Position the setscrew in the end of the terminal as shown. (fig 1). Screw the terminal onto the threaded end of the cable until it bottoms against the setscrew. Tighten the setscrew securely (do not exceed 20-25in.lbs).



2. To fit gearchange cable attach the cable to the shift selector, ensuring that it is mounted in the correct spigot hole. (fig 2).

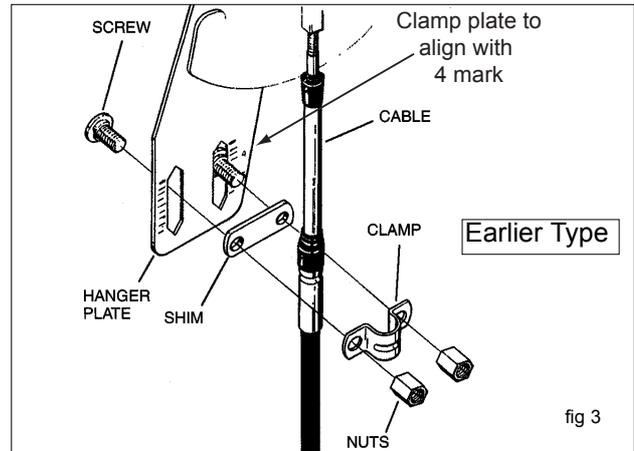
**CAUTION**

Using the incorrect location with respect to the cable hanger position other than shown will cause improper control operation and damage to the system.

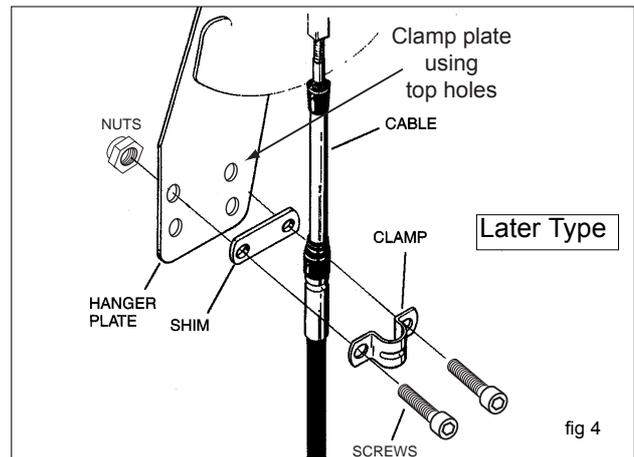


3. There are two types of hanger bracket. Determine which type of hanger bracket is used.

On the earlier type, centre of two serrated screws is aligned with 4 mark on front surface. Note: screws must be line across hanger with serrations mating into hanger plate serrations. (fig 3).

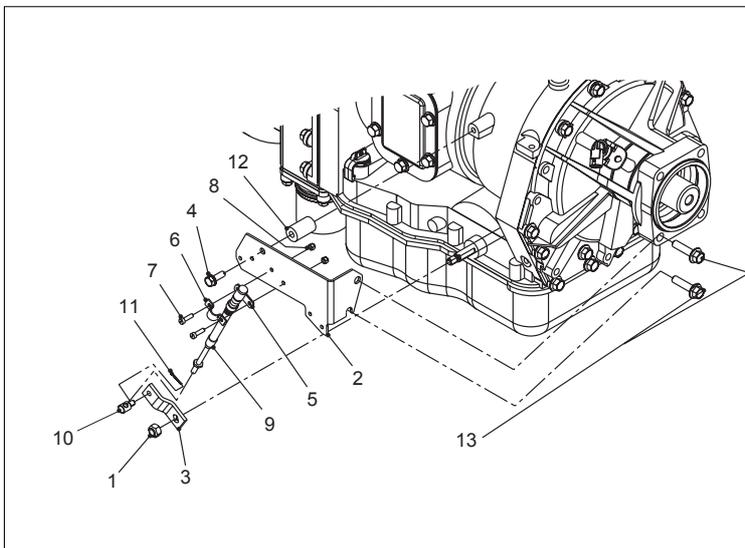


On later type hanger plates the cable is clamped using the top set of holes on the hanger plate. These are marked 40S on the rear surface of the hanger plate. (fig 4).



During assembly ensure that the protrusion on the inside face of the clamp is correctly located in the recess on the cable ferrule. Ensure that a new cable clamp, shim and fixings are used.

Fit nuts and torque tighten (8 - 10Nm).



**Key**

1. Nut - selector lever (20-27 Nm)
2. Bracket - gearchange cable
3. Shift lever
4. Screw - self tapping
5. Shim
6. Clamp
7. Screw - M5
8. Locknut
9. Gearchange cable
10. Pivot
11. Split pin
12. Spacer
13. Bolt - M10 (51-61 Nm)

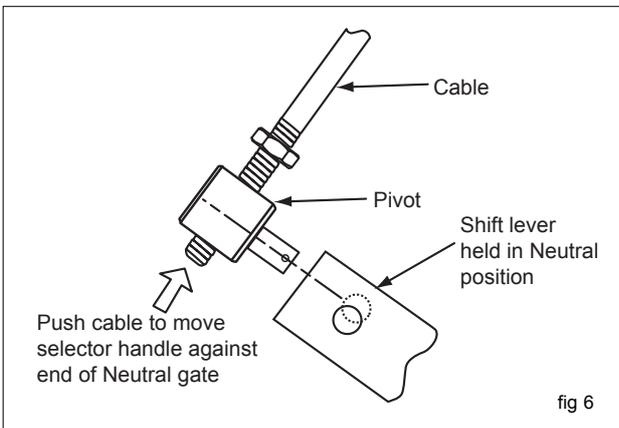
fig 5

4. At the gearbox end the change speed cable bracket is attached to the gearbox with self tapping screws (4) bolts (13) and a spacer (12). The selector lever (3) is retained by a locknut (1). Place clamp (6) ensuring engagement in recess on cable ferrule, place shim (5) between cable hub and gearchange cable bracket (2), secure with screws (7) and locknuts (8). Fit nuts and torque tighten (8 - 10Nm).

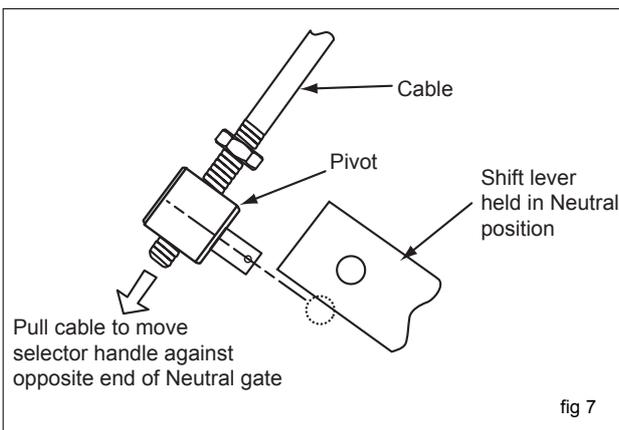
5. Ensure the gearchange selector in drivers cab is in the neutral position.

6. Move shift lever on gearbox to neutral position.

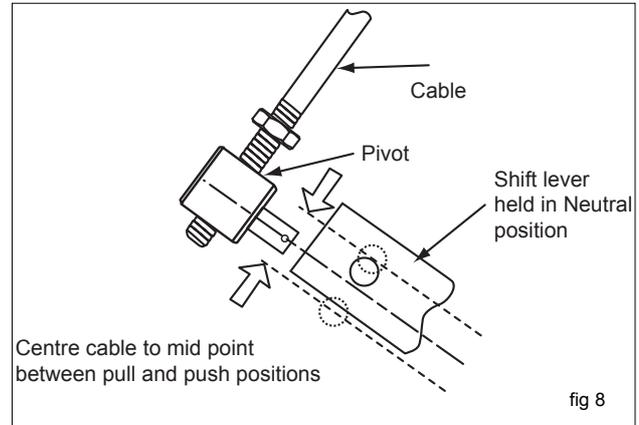
7. At the gearbox end, push the cable and note the position of the cable end (pivot) in relation to the hole in the shift lever. (fig 6).



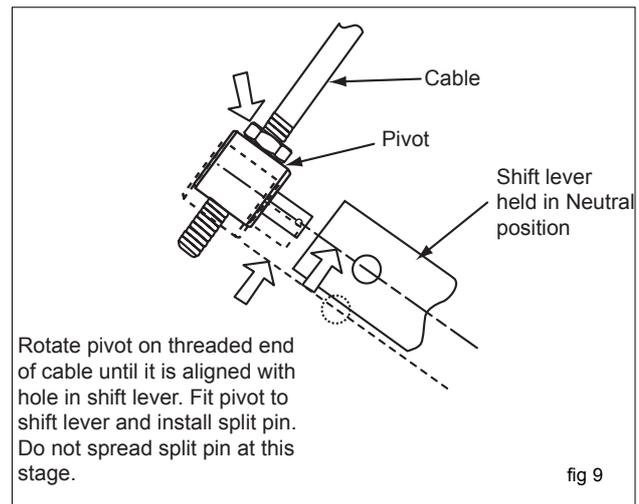
8. Pull the cable and again note the position of the pivot in relation to the hole in the shift lever. (fig 7).



9. Centre the position of the cable at the mid point of travel determined by the previous two stages. (fig 8).



10. Holding the cable at the position determined in the previous step, rotate the pivot (10) on the threaded section of the cable until it lines up with the hole in the shift lever.(3). (fig 9).



Verify by pulling and pushing cable to establish mid point of travel. The pivot pin should be re aligned with hole in shift lever.

11. Insert pivot (10) into shift lever (3) and fit split pin (11) do not spread split pin at this stage. Ensure that the attachment pin of the pivot does not bind in the shift lever hole.

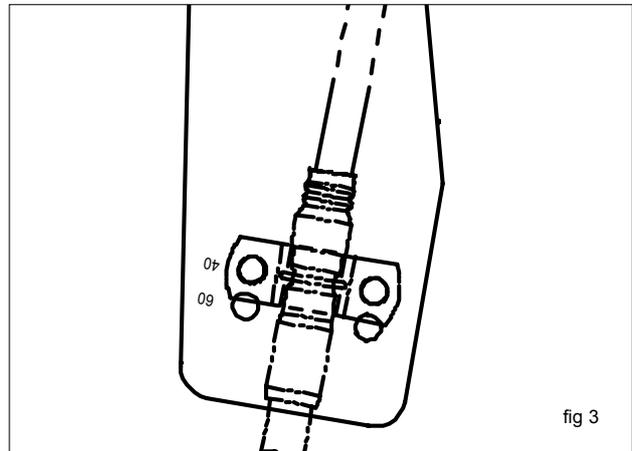
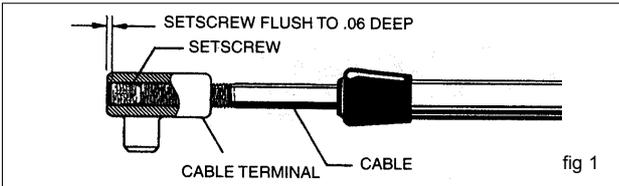
Move range selector through all positions to ensure that it is synchronised with the transmission. Adjust pivot if necessary, spread split pin and tighten rod nut against pivot.

Note: As the the lock nut is part of the cable assembly, its' relative position to the pivot is governed purely by the adjustment at installation.

Therefore, providing the lock nut 'locks' its' position can be either side of the pivot.

**Change Speed Linkage 3 Position**

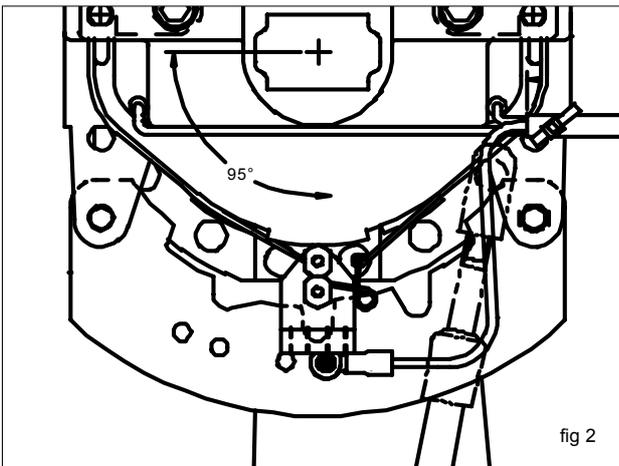
1. If fitting a new cable remove and discard cable nut. Position the setscrew in the end of the terminal as shown. (fig 1). Screw the terminal onto the threaded end of the cable until it bottoms against the setscrew. Tighten the setscrew securely (do not exceed 20-25in.lbs).



2. To fit gearchange cable attach the cable to the shift selector, ensuring that it is mounted in the correct spigot hole. (fig 2).

**CAUTION**

Using the incorrect location with respect to the cable hanger position other than shown will cause improper control operation and damage to the system.



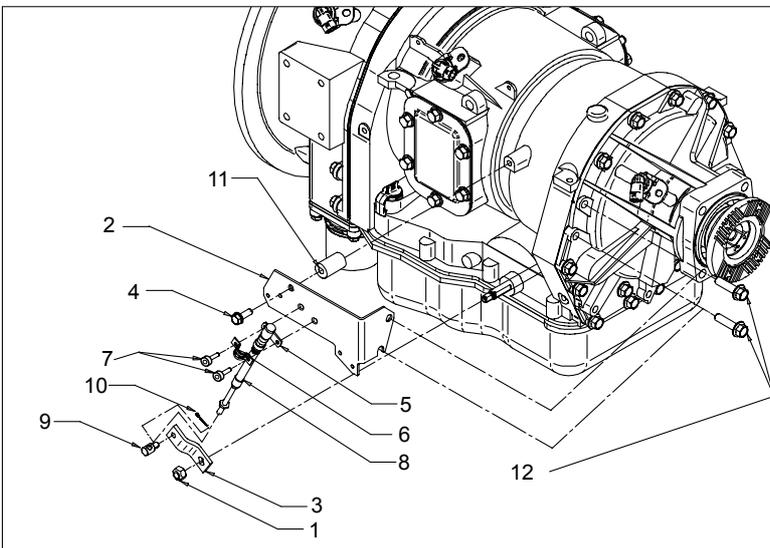
3. The cable is clamped using the top set of holes on the hanger plate. These are marked 40 on the surface of the hanger plate. (fig 3).

During assembly ensure that the protrusion on the inside face of the clamp is correctly located in the recess on the cable ferrule. Ensure that a new cable clamp, shim and fixings are used.

Fit nuts and torque tighten (8 - 10Nm).

4. At the gearbox end the change speed cable bracket is attached to the gearbox with self tapping screws (4) bolts (12) and a spacer (11). The selector lever (3) is retained by a locknut (1).

Place clamp (6) ensuring engagement in recess on cable ferrule, place shim (5) between cable hub and gearchange cable bracket (2), secure with screws (7) in threaded holes marked 'D', torque tighten (3 - 4Nm).

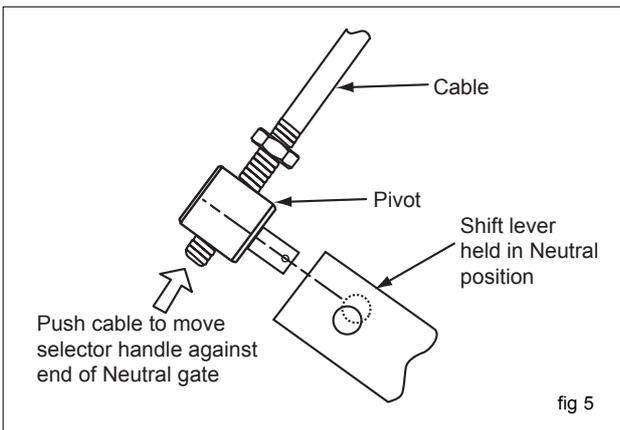


**Key**

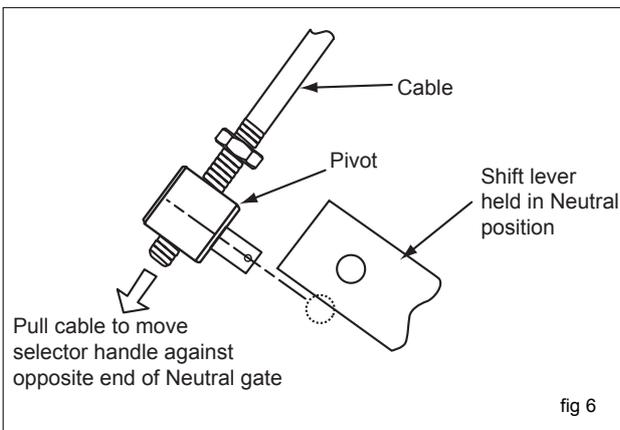
- 1. Nut - selector lever (20-27 Nm)
- 2. Bracket - gearchange cable
- 3. Shift lever
- 4. Screw - self tapping
- 5. Shim
- 6. Clamp
- 7. Screw - M5
- 8. Gearchange cable
- 9. Pivot
- 10. Split pin
- 11. Spacer
- 12. Bolt - M10 (51-61 Nm)

fig 4

5. Ensure the gearchange selector in drivers cab is in the neutral position.
6. Move shift lever on gearbox to neutral position.
7. At the gearbox end, push the cable and note the position of the cable end (pivot) in relation to the hole in the shift lever. (fig 5).



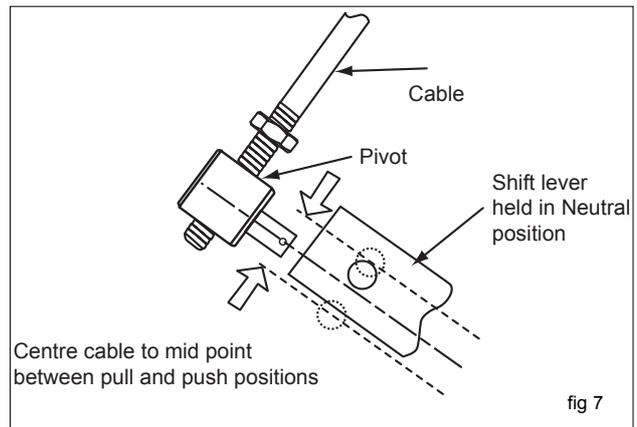
8. Pull the cable and again note the position of the pivot in relation to the hole in the shift lever. (fig 6).



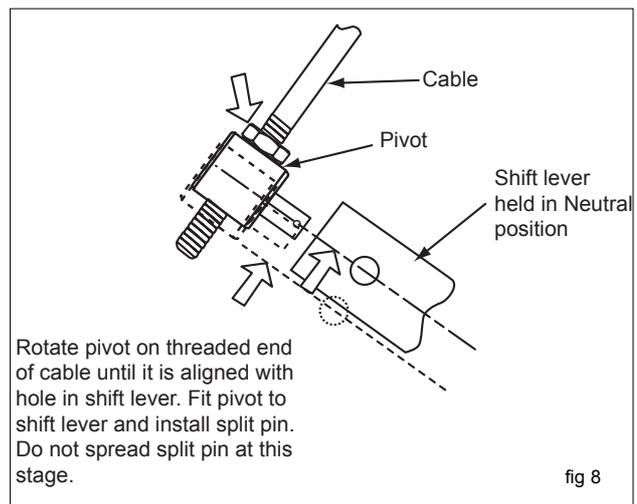
9. Centre the position of the cable at the mid point of travel determined by the previous two stages. (fig 7).

10. Holding the cable at the position determined in the previous step, rotate the pivot (9) on the threaded section of the cable until it lines up with the hole in the shift lever.(3). (fig 8).

Verify by pulling and pushing cable to establish mid point of travel. The pivot pin should be re aligned with hole in shift lever.



11. Insert pivot (9) into shift lever (3) and fit split pin (10) do not spread split pin at this stage. Ensure that the attachment pin of the pivot does not bind in the shift lever hole.



Move range selector through all positions to ensure that it is synchronised with the transmission. Adjust pivot if necessary, spread split pin and tighten rod nut against pivot.

Note: As the the lock nut is part of the cable assembly, its' relative position to the pivot is governed purely by the adjustment at installation.

Therefore, providing the lock nut 'locks' its' position can be either side of the pivot.

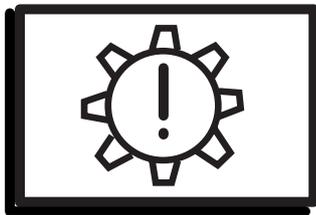
### Transmission fault light (red)

The electronic control system is programmed to tell the operator when a problem has occurred with the transmission system by means of the transmission fault light on the instrument panel.

Every time the engine is started the transmission fault light will illuminate and then go out after a few seconds, this is a circuit check to confirm that the bulb and wiring are working correctly. If the transmission fault light comes on at any time after start up it indicates that a problem has been detected by the transmission control module (TCM) which will register a diagnostic trouble code (DTC).

When a failure condition is detected, the DTC set by the TCM remains active as long as the ignition is switched on, when the ignition is switched off and on again the DTC is reset and the TCM checks again for the failure condition. If the failure condition is not detected the previous DTC will remain in history, the transmission fault light will go out after the circuit check and the transmission will function normally unless another fault occurs, this enables the vehicle to be driven to a service centre.

While the transmission fault light is illuminated, up and down shifts may be restricted, and direction changes may not occur.



### Range inhibited light (red)

The range inhibited light mounted on the dashboard tells the operator that the transmission is being inhibited and range changes requested by the operator may not occur. When certain operating conditions are detected by the TCM the transmission will be locked in the range which is in use at that time.



### Troubleshooting when no diagnostic codes are present

Check the basics first.

Make sure the range selector is in the appropriate position.

Check that the batteries are fully charged

Begin by checking the transmission fluid level and the ignition voltage. Some problems are temperature related, so all tests should be carried out at the temperature that the problem occurs.

Make sure that the throttle is closed and engine speed is below 900 RPM.

Check that all electrical connections are properly made.

Check all support equipment for correct installation and operation.

If the shifting process is rough, time must be allowed for the shifts to adapt to the "converged" state before assuming there is a problem.

### Troubleshooting intermittent diagnostic codes

Intermittent codes are a result of conditions which are not always present.

When a code is logged in the memory it will remain there until it is manually cleared or the vehicle completes forty code free warm up cycles.

When an intermittent code exists check for the following:

- 1 Dirt, damaged or corroded harness connectors or terminals.
- 2 Terminals not fully seated in the connectors.
- 3 Damaged harnesses (poor routing, chafing, excessive heat, tight bends etc).
- 4 Incorrectly mounted electronic control components.
- 5 Poor connector seals, where fitted.