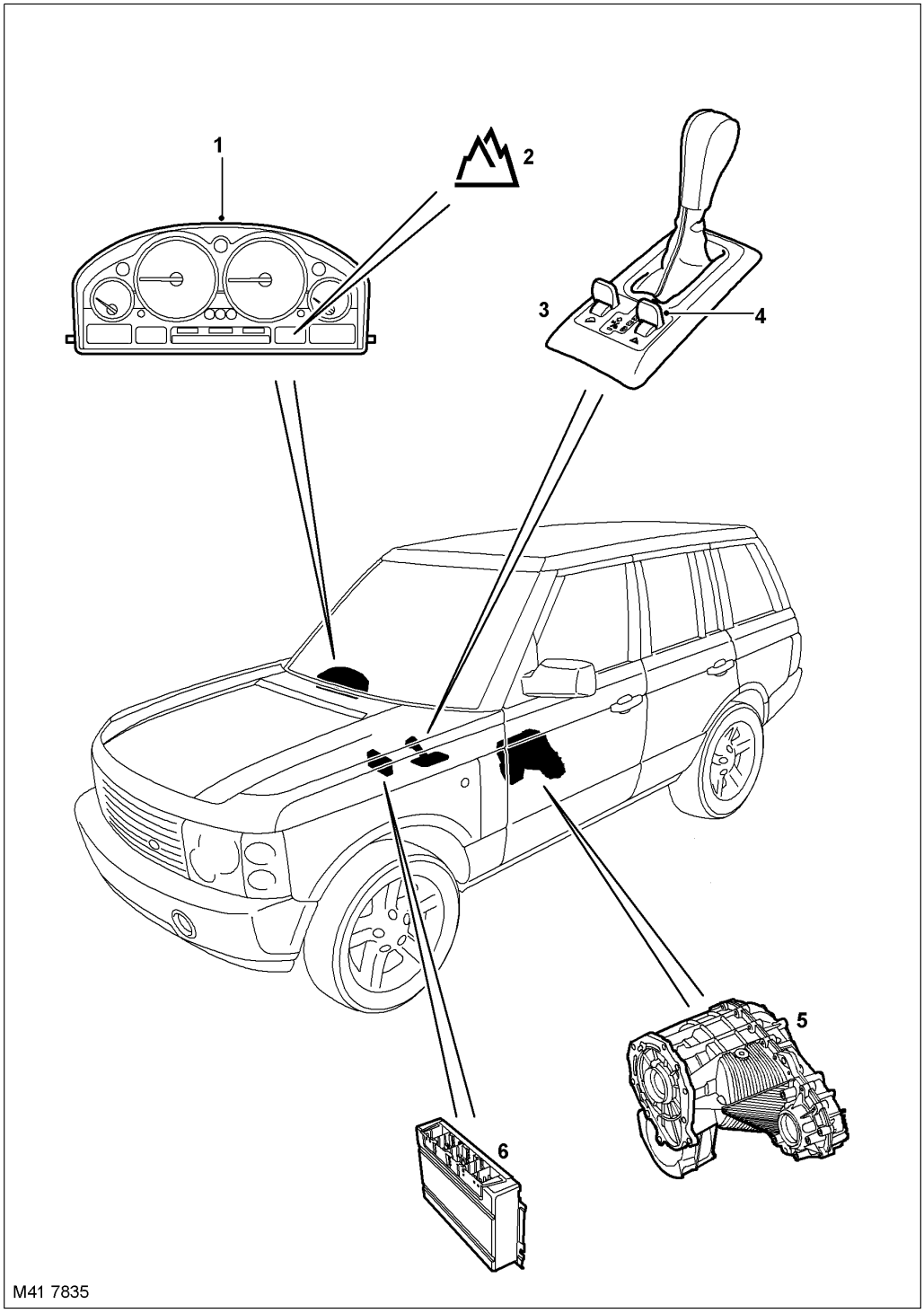
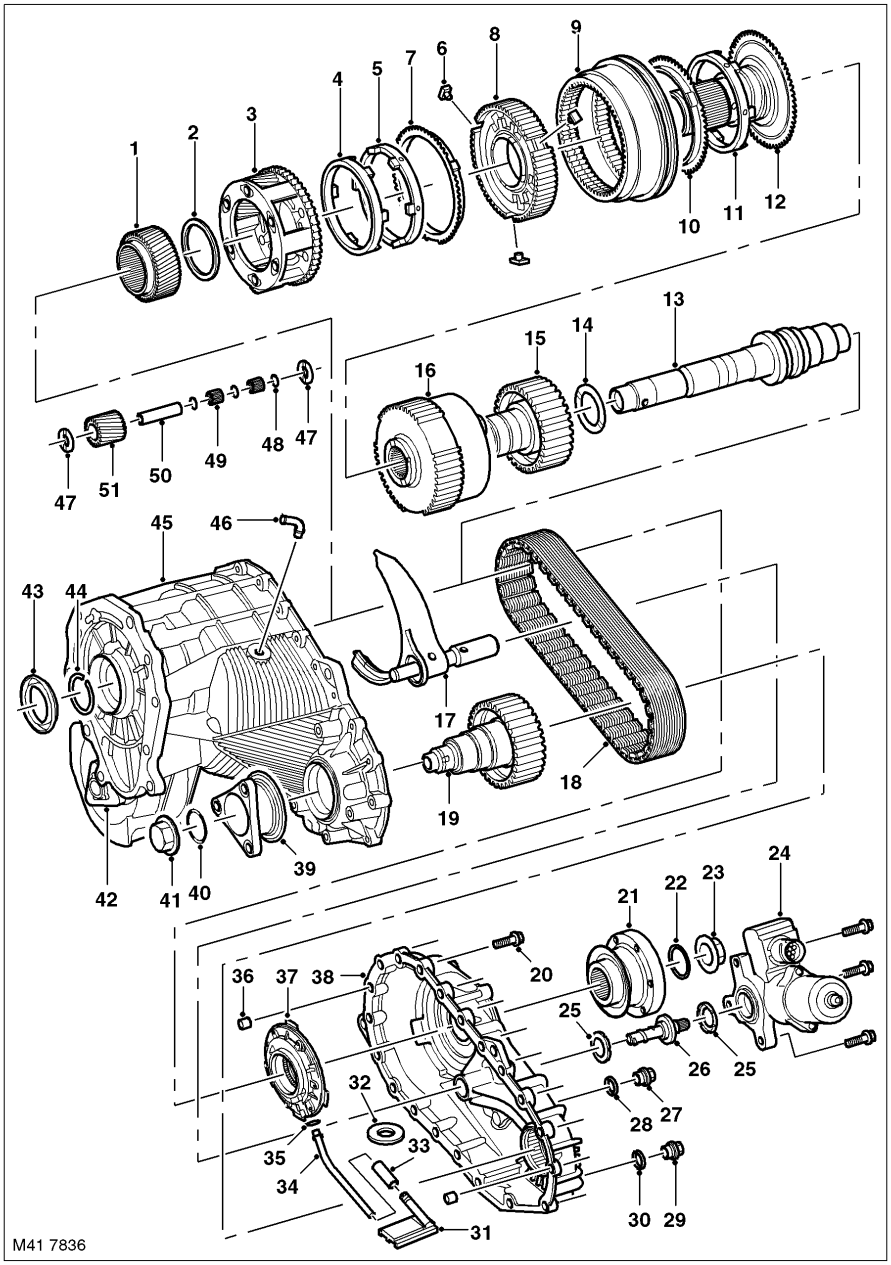
TRANSFER BOX COMPONENT LOCATION



1. Instrument pack
2. Low range warning lamp
3. Selector lever assembly
4. High/low range selection switch
5. Transfer box
6. Transfer box ECU

TRANSFER BOX EXPLODED VIEW



1. Sun gear
2. Thrust washer
3. Planetary gear set assembly
4. Inner blocker ring
5. Cone
6. Detente (3)
7. Outer blocker ring
8. Hub - synchronizer
9. Sleeve - synchronizer
10. Outer blocker ring
11. Cone
12. Input shaft assembly
13. Main shaft
14. Thrust washer
15. Drive sprocket assembly
16. Torsen® differential assembly
17. Fork and rail assembly
18. Chain
19. Front output shaft assembly
20. Bolt (23)
21. Flange assembly - rear output
22. Flange O-ring
23. Flange nut
24. Actuator assembly
25. Thrust bearing (2)
26. Lead screw
27. Filler/level plug
28. Seal
29. Drain plug
30. Seal
31. Filter screen
32. Chip collector magnet
33. Connector tube
34. Pump feed tube
35. O-ring seal
36. Dowel (2)
37. Oil pump assembly
38. Rear casing assembly
39. Front output flange assembly
40. Flange O-ring
41. Flange nut
42. Mounting bush
43. Input seal
44. Retaining ring
45. Front casing assembly
46. Vent assembly
47. Pinion thrust washer (8)
48. Roller separator ring (12)
49. Pinion planet roller (144)
50. Planet pinion shaft (4)
51. Planet pinion gear (4)

TRANSFER BOX

GENERAL

The NV225 Transfer Box is a full time, permanent four wheel drive, torque splitting transmission with equal torque distribution to the front and rear propeller shafts. The transfer box has the following features:

- Permanent four wheel drive with 50/50 torque split
- Two speed, fully synchronized 'shift on the move' system with electronic control and operation
- High range direct drive and low range via epicyclic gearset
- Torsen® Type B torque sensing and torque biasing centre differential
- Self lubricating oil pump system.

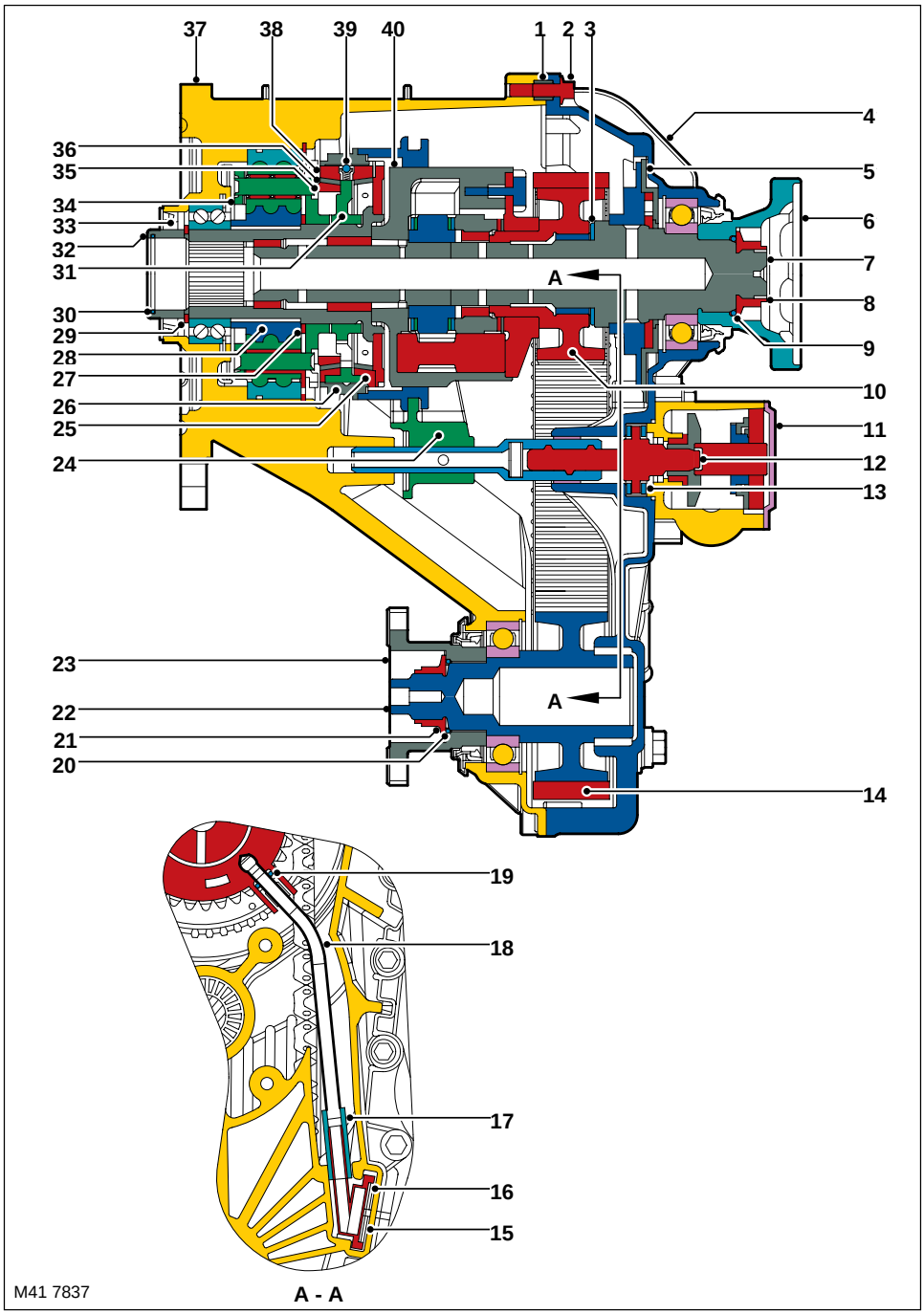
The transfer box is located under the vehicle in a subframe, behind the transmission. The transfer box is manufactured by New Venture Gear in Roitzsch, Germany.

The transfer box receives an input from the transmission output shaft which is passed through the unit to two outputs for the front and rear propeller shafts.

The transfer box provides full time four wheel drive via a 50:50 torque sensing Torsen® differential. The unit design allows “shift on the move” from high to low range and visa versa. A planetary gearset with helical planetary pinion gears provides low range operation. When in low range, the planetary gearset provides a ratio of 2.69:1 which gives the vehicle an extremely low, low range crawl speed. High range is a direct drive from the transmission output shaft and provides a 1:1 ratio.

The transfer box has electronic control, via a PWM actuator (DC motor), on the shift from high to low range. The actuator is controlled by a transfer box ECU, which is located behind the battery in the engine compartment.

Transfer Box – Sectional View



1. Dowel (2 off)
2. Bolt (23 off)
3. Thrust washer
4. Rear casing assembly
5. Oil pump assembly
6. Rear output flange assembly
7. Main shaft
8. Flange nut
9. Flange O-ring
10. Drive sprocket assembly
11. Actuator assembly
12. Lead screw
13. Thrust bearing (2 off)
14. Chain
15. Chip collector magnet
16. Filter screen
17. Connector – pump feed tube
18. Pump feed tube
19. O-ring seal
20. Flange O-ring
21. Flange nut
22. Front output shaft assembly
23. Front output flange assembly
24. Fork and rail assembly
25. Outer blocker ring
26. Sleeve - synchronizer
27. Thrust washer
28. Sun gear
29. Retaining ring
30. O-ring seal
31. Hub - synchronizer
32. Input shaft assembly
33. Input seal
34. Planetary gearset assembly
35. Inner blocker ring
36. Cone
37. Front casing assembly
38. Outer blocker ring
39. Detente (3 off)
40. Torsen® differential assembly

The major components of the transfer box are; the front casing assembly, the rear casing assembly, the planetary gearset, the Torsen® differential, the fork and rail assembly and the actuator assembly.

The front and rear casing assemblies are manufactured from cast aluminium. Fins are cast into the front casing to aid heat dissipation. Both casing assemblies are bolted together and provide the bearing locations for the main shaft, the Torsen® differential and the planetary gearset. The rear casing provides the attachment location for the actuator assembly.

An oil pump assembly is located in the rear casing and is driven by a splined coupling on the main shaft. The pump has an oil tube to the bottom of the two casings with a filter screen to collect particulate matter. A magnet is located below the filter screen to collect any metallic particulate matter. The oil pump provides a pressurized supply to a drilling in the centre of the main shaft. Cross-drillings in the main shaft provide lubrication for the bearings and rotary components.

Drive is passed from the input shaft and via the Torsen® differential to the mainshaft and the drive sprocket assembly. The mainshaft rotates and passes the rotational motion to the rear propshaft. The drive sprocket assembly rotates and passes this rotation, via the chain, to the front propshaft. The drive sprocket carries a 3/8” pitch drive chain which drives a sprocket which is integral with the front output shaft. Because both sprockets are the same, with the same number of drive teeth, the rotational motion of the drive sprocket is identical to that of the front output shaft sprocket.

The 50:50 torque output ratio is produced from the Torsen® differential unit. This unit can drive the output to the main shaft and the drive sprocket assembly at a 50:50 ratio during normal driving conditions.

The transfer box requires a unique oil developed with NVG and Burmah-Castrol specifically for the Land Rover transfer box. The oil is a fully synthetic with the following specification: BOT 26 FMB 1 75W-90. The oil contains unique additives which enhance the transfer box operation. No other oil must be used in the transfer box.

Should the transfer box require repair, the only serviceable items are the input and two output shaft seals, the drain and filler plugs, the actuator and gearbox assembly and the breather tube. Any repairs beyond the items listed requires a replacement transfer box.

A filler/level plug is provided to ensure that the correct oil level is achieved after a service repair has been carried out. The level must be checked and adjusted with the transmission fully assembled and the vehicle on level ground. The transfer box contains 0.996 litres of oil. The transfer box is a fill for life unit and no level check is required at service unless a leak is present.

PLANETARY GEARSET

The planetary gearset consists of a front and rear carrier half, an input shaft, four planet pinion gears, four planet pinion shafts and one hundred and forty four needle rollers.

The input shaft is located through the planetary carriers and is driven by the output shaft from the transmission. The sun gear is located on splines on the input shaft and rotates at the same speed. Rotation of the sun gear is transferred to the four pinion planet gears which in turn rotate around an annulus gear located in the front casing and secured with a retaining ring.

The rotation of the planetary pinion gears causes the front and rear carriers to rotate. The rear carrier has gear teeth which mesh with the teeth in the sleeve. To smooth the transition of the gear teeth of the sleeve and the rear carrier, an inner and outer blocker ring and a cone are fitted. When the fork moves the sleeve, the three detents in the hub are pushed, which in turn push the inner and outer blocker rings and the cone together. These items mesh together at an angle and operate as a synchromesh to provide smooth engagement of the gear teeth and the transition into low range.

The input shaft also has an outer blocker ring and a cone between the shaft and the hub. When the fork moves the sleeve, the three detents in the hub are pushed, which in turn push the outer blocker ring and the cone together. These items also mesh together at an angle and operate as a synchromesh to provide smooth engagement of the gear teeth of the hub and the input shaft and the transition into high range.

FORK AND RAIL ASSEMBLY

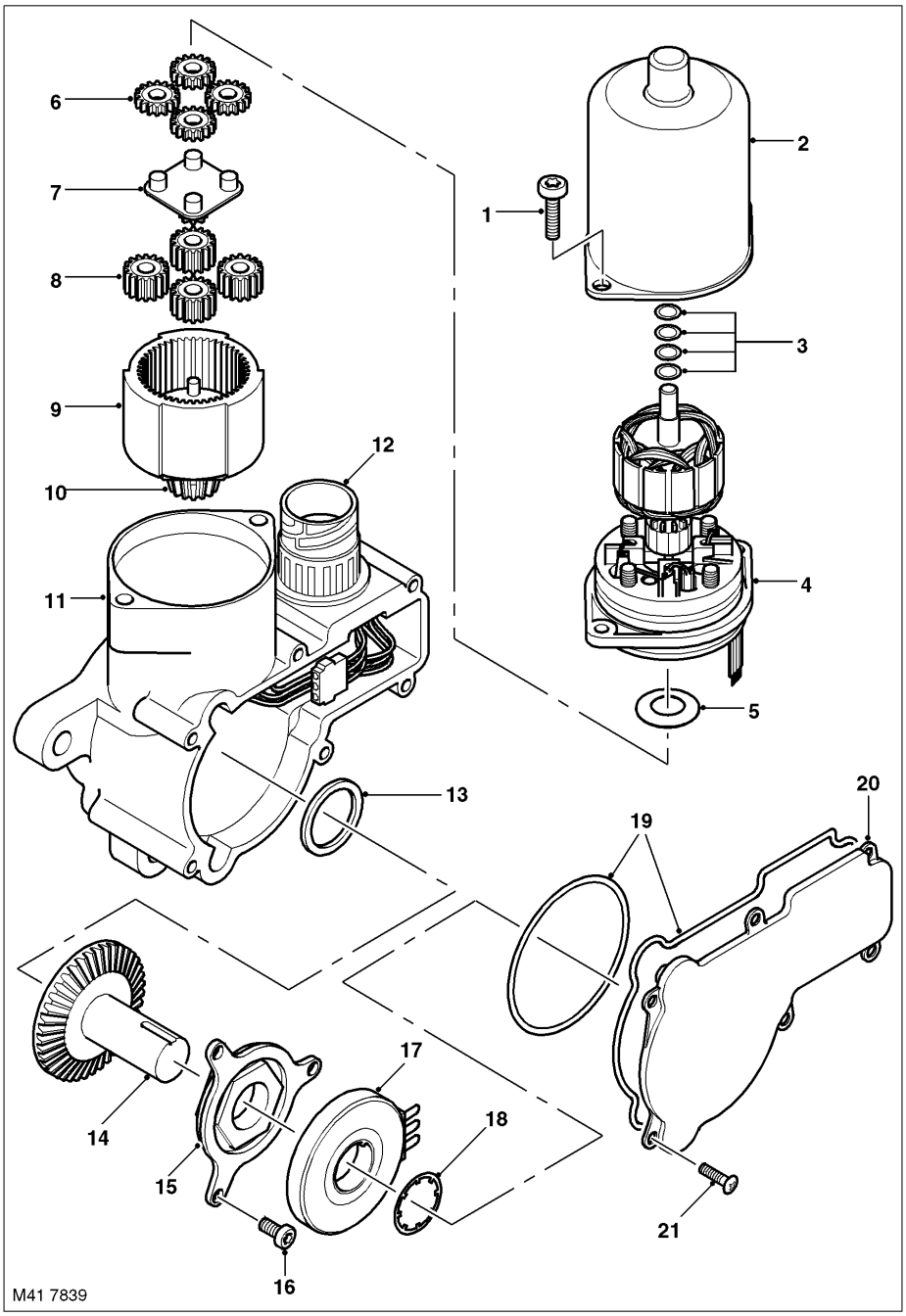
The fork and rail assembly is the main component for changing from high to low ratio and is driven by the actuator assembly and the lead screw. The actuator rotates the lead screw, via the gearbox, which in turn moves the fork and rail assembly linearly in plain bearings in the front and rear casings. The fork is positively located in a stepped ring on the outer diameter of the synchronizer sleeve. Therefore, linear movement of the fork is transferred to the sleeve which initiates the range change.

MOTOR AND GEARBOX ASSEMBLY

The actuator and gearbox is located on the rear casing and secured with three bolts. The purpose of the actuator and gearbox is to electrically change the ratio of the transfer box from low to high and visa versa.

The actuator is a DC four brush motor which is controlled by PWM signals from the transfer box ECU. The wires from the ECU are large diameter and are twisted to minimize electrical interference. The motor has an internal four pin integral connector which, when installed in the housing, mates with a female connector located in the housing. The motor housing contains the magnets which, along with the armature and brush assembly, operate the motor. The housing is located on the armature and brush assembly mounting plate which in turn is secured with screws into the main housing. The shaft of the armature and brush assembly locates in a pressed plain bearing in the housing and is adjusted for end float with shims. The opposite end of the shaft has a toothed gear which mates with the reduction gearbox.

The reduction gearbox consists of an annulus housing, eight planetary gears and a sun gear and carrier plate. The annulus housing has a shaft and a planet gear carrier plate. The planet gear carrier plate is attached to the shaft inside the annulus housing. A bevel gear is attached to the opposite end of the shaft on the outside of the housing. The planet gear carrier plate has four pins which provide the attachment and pivot points for four planet gears. The sun gear and carrier plate is located in the annulus housing with the sun gear locating between the four planetary gears. The carrier plate has four pins which provide for the location and pivot points for four further planetary gears. The toothed gear on the armature and brush assembly shaft locates between these four gears and provides the drive input into the reduction gearbox.



1. Screw (2 off)
2. Housing
3. Shims
4. Armature and brush assembly
5. Thrust washer
6. Planet gears
7. Sun gear and carrier plate
8. Planet gears
9. Annulus housing
10. Bevel drive gear
11. Housing
12. Electrical connector
13. Thrust washer
14. Drive shaft and bevel gear assembly
15. Mounting plate
16. Screw (3 off)
17. Potentiometer
18. Circlip
19. Gasket (2 off)
20. Cover
21. Screw (6 off)

The housing is manufactured from cast aluminium and is machined to accept the reduction gearbox and the drive shaft and bevel gear assembly. Three bosses with holes provide for the attachment of the housing to the transfer box rear casing assembly. An cast aluminium cover is sealed to the housing with two 'O' section gaskets and secured with six screws. The housing has a machined hole which is fitted with a plain brass bush to accept the drive shaft and bevel gear assembly. An oil seal is fitted behind the bush to provide a seal between the drive shaft and the transfer box rear casing half.

A hole in a boss on the housing allows for the fitment of the ten pin electrical connector to the ECU. The connector is secured in the housing with a spring clip and lip seal. A machined slot in the housing provides location for a second connector with four female pins. This connector mates with a similar male connector which is an integral part of the armature and brush assembly mounting plate and supplies power feed and ground connections for the motor.

The drive shaft and bevel gear assembly consists of a machined shaft, bevel gear and a mounting plate. The drive shaft has internal splines at one end. The splines have a missing tooth to act as a keyway which mates with the lead screw, providing the correct timing for the lead screw to the motor position. The bevel gear is an interference fit and is pressed onto the drive shaft. The opposite end of the shaft accepts the mounting plate and has a machined groove to provide a positive drive for the rotary potentiometer.

The mounting plate is located on the shaft and is secured in the housing with three screws and retains the drive shaft laterally. An external hexagonal boss on the mounting plate mates with a hexagonal moulding on the potentiometer. This provides a positive location for the potentiometer, preventing the potentiometer housing from rotating and providing the correct orientation for the potentiometer connector.

A third connector in the housing has three female pins which mate with similar male pins on the potentiometer. These pins supply a 5V reference supply, an output signal and ground for the potentiometer. The connector is connected to the pins of the ten pin electrical connector.

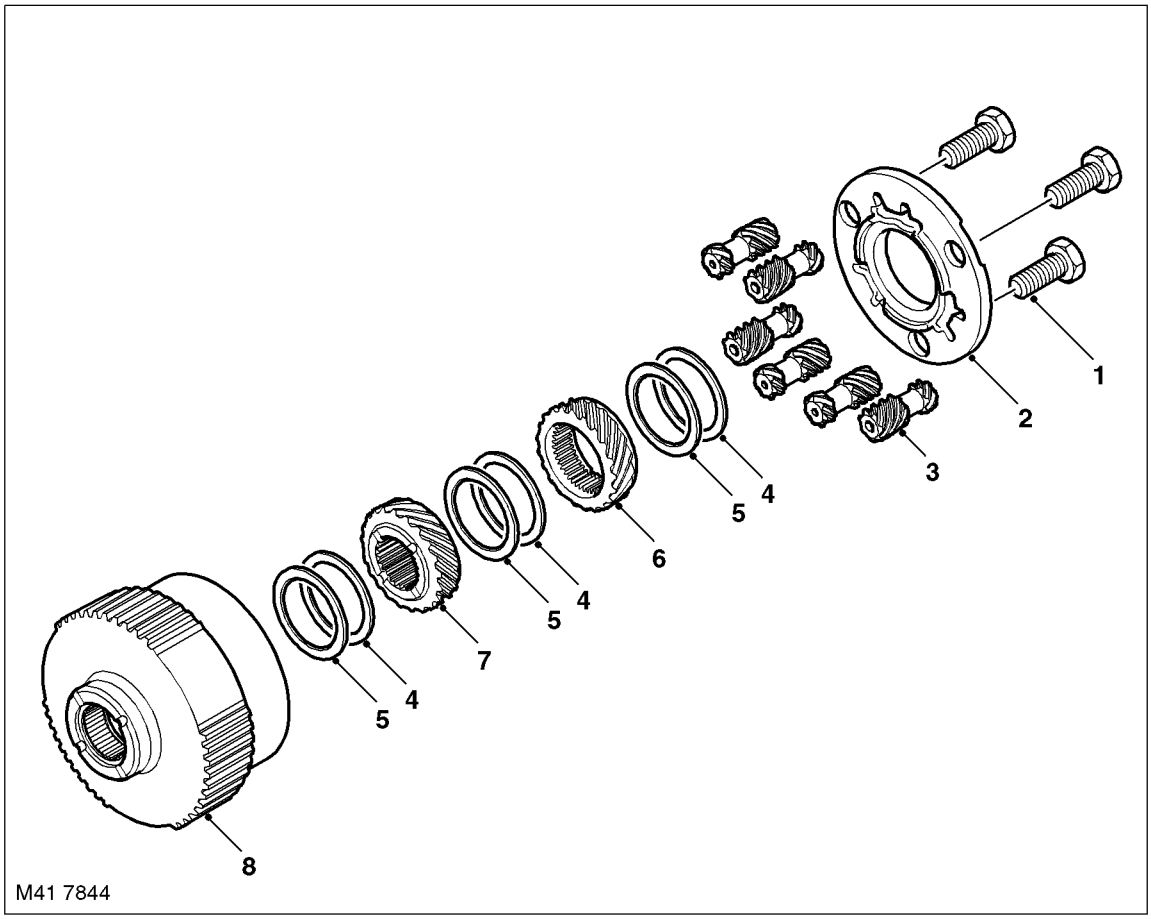
If the actuator and gearbox assembly is to be removed, the synchronizer sleeve position must be set to low range using TestBook/T4 before the assembly is removed.

TORSEN® DIFFERENTIAL

The Torsen® Type B traction differential unit is an integral part of the transfer box and is produced by Zexel Torsen of Belgium. The unit is a full time torque sensing and biasing system using parallel gearing for increased life and quiet operation.

During normal driving conditions, the Torsen® unit supplies a nominal 50:50 torque output to the front and rear drive shafts via the transfer box main shaft and the drive sprocket assembly.

The torque biasing capability consists of the ability to 'bias' the torque from the transmission to the axle and wheels with the higher grip. This must be achieved without causing wheel slip to the wheels of the axle with the lower grip within the biasing range of approximately 35/65 to 65/35 front to rear.

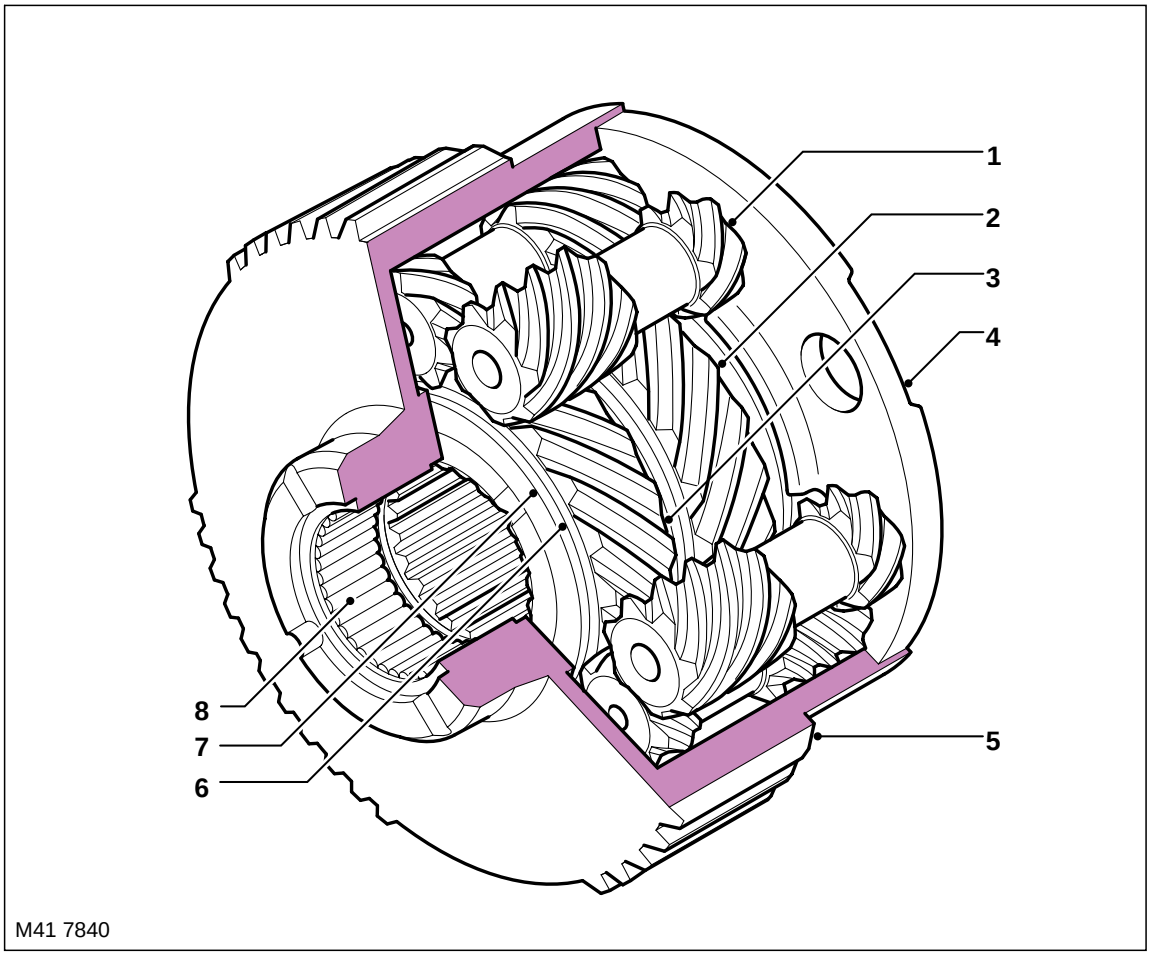


1. Bolt (3 off)
2. Cover plate
3. Pinion gear (6 off)
4. Thrust washer
5. Friction thrust washer
6. Side gear (front propshaft drive)
7. Side gear (rear propshaft drive)
8. Housing/ring gear

The torque biasing capability is instantaneous and operates as a preventative system. The unit does not need wheel slip and speed differentiation to be activated. The unit senses, via torque saturation within the unit, that one propeller shaft has the intention to rotate faster than the other one. The unit then biases the torque away from that propeller shaft and applies it to the other propeller shaft. Conventional systems require the wheel slip to occur first before initiating the torque biasing action. Because the Torsen® unit reacts before the slip occurs, the driving action is very smooth which results in enhanced grip for the road wheels.

The Torsen® unit consists of a housing, two side gears, six pinion gears, thrust and friction washers and a cover plate.

The housing is a machined casting which contains all the differential components. Six machined pockets accept the pinion gears. The base of each pocket has a cast recess which retains oil to lubricate the pinion gear ends. The closed end of the housing has a roller bearing pressed into a hole. The transfer box main shaft is located through the bearing which provides support between the housing and the shaft. The main shaft has cross drillings which supply lubricating oil from the oil pump to the internal components of the differential.



1. Pinion gear (6 off)
2. Side gear (front propshaft drive)
3. Side gear (rear propshaft drive)
4. Cover plate
5. Housing/ring gear
6. Friction thrust washer
7. Thrust washer
8. Roller bearing

Three threaded holes are located equally around the open end of the housing and provide for the attachment of the cover plate with bolts. The outer circumference of the housing has cast and machined teeth which mesh with corresponding teeth in the transfer box synchronizer sleeve. Rotational input from the transmission is passed, via the transfer box input shaft, directly to the synchronizer sleeve for high range or indirectly to the synchronizer sleeve via the planetary gear set for low range. The teeth on the housing allow for the sliding motion of the synchronizer sleeve when the transfer box range is changed.

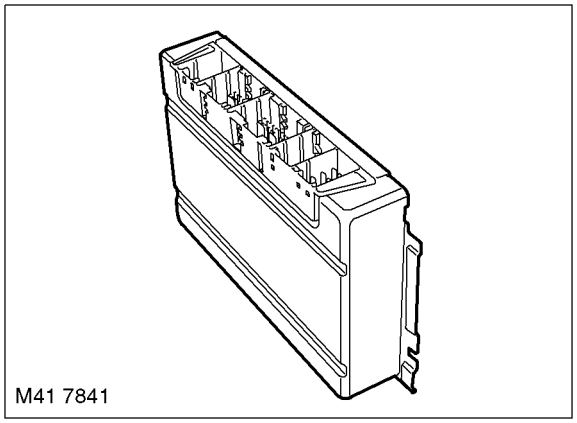
The pinion gears are parallel, helical gears which locate in the machined pockets in the housing. The lands of the helical teeth are ground with a radius which matches the internal diameter of the housing pockets. This creates frictional forces between the pinion gears and the housing and contributes to the operation of the unit. Each pinion gear has a machined section with no teeth. The pinions are fitted in the housing in opposite pairs. When fitted, one pinion gear of each pair meshes with one of the side gears, with the machined section of that gear preventing meshing with the other side gear.

The side gears have helical teeth machined on their outer circumference. The inner diameter of the side gears are different sizes and both have machined splines. The side gear with the smaller diameter bore locates on mating splines on the main shaft and provides output drive to the rear propeller shaft. The remaining side gear locates on mating splines on the drive sprocket and, via the chain and the front output shaft, provides output drive to the front propeller shaft. The side gears are located in the housing, supported laterally by the pinion gears. Transverse location is provided by the main shaft and three pairs of friction washers.

The friction washers are one washer with two ground faces. The second washer has one ground face and the opposite face has a sintered friction material. Axial thrust applied to the side gears from the pinion gears, forces the side gears into contact with two of the three pairs of thrust washers, causing a locking of the side and pinion gears under certain circumstances.

The cover plate is located on the open end of the housing and is secured with three bolts. The cover plate provides location for the ends of the pinion gears. A cast recess for each pinion gear retains oil to lubricate the pinion gear ends.

TRANSFER BOX ECU



The transfer box ECU is located behind the battery, on the bulkhead.

The transfer box ECU is the main unit for controlling the operation of the transfer box. The ECU software was designed in conjunction with Land Rover, Siemens and New Venture Gear. The ECU is connected on the CAN bus and controls the transfer box operation using CAN messages from other ECU's on the network.

The transfer box ECU uses three connectors for all inputs and outputs. The ECU receives one permanent power supply via a 50A fusible link located on the bulkhead, behind the battery, and an ignition supply via fuse 33 in the passenger compartment fusebox. A second feed via the ignition switch position I and fuse 37 in the passenger compartment fusebox, activates the neutral selection function. Refer to Operation - Neutral Selection for further details.

The ECU memorizes the position of the actuator when the ignition is switched off. When the ignition is subsequently switched on, the ECU powers the actuator until the lead screw drives the fork and rail assembly against the end stop for the previous range. The ECU then calibrates itself to this position and confirms that the selected range is correct.

The ECU controls the closed loop position sensing system within the actuator and regulates the power supply to the motor to ensure the optimum shift quality is achieved. Using a series of specific software algorithms, the ECU is capable of adjusting the performance of the synchronizer system to produce smooth and effortless shifting, regardless of temperature and vehicle speed, providing the neutral and speed parameters are achieved.

The ECU uses a series of programmed shift maps to control the synchronisation speed and ensure that a maximum shift time of 1.2 seconds is achieved.

If the ECU is replaced, TestBook/T4 must be connected to the vehicle and the transfer box ECU self-calibration procedure must be performed. This procedure must also be performed if the actuator and gearbox assembly is replaced.

Default/Limp Home Strategy

If a fault occurs with the transfer box, the transfer box ECU or one of the required input signals, i.e.; road speed signal, the ECU records an error code and the transfer box low range 'mountain' symbol in the instrument pack flashes permanently.

As a default setting, the ECU will attempt to engage high or low range in order to allow the vehicle to be driven to a Land Rover dealer for repair. To ensure a range is engaged, the ignition must be switched off and then on again (timed shift performs this without ignition cycling). This causes the ECU to power the actuator and engage the previously selected range.

DIAGNOSTICS

The transfer box ECU can store fault codes which can be retrieved using TestBook/T4 or a diagnostic tool using KW2000* protocol.

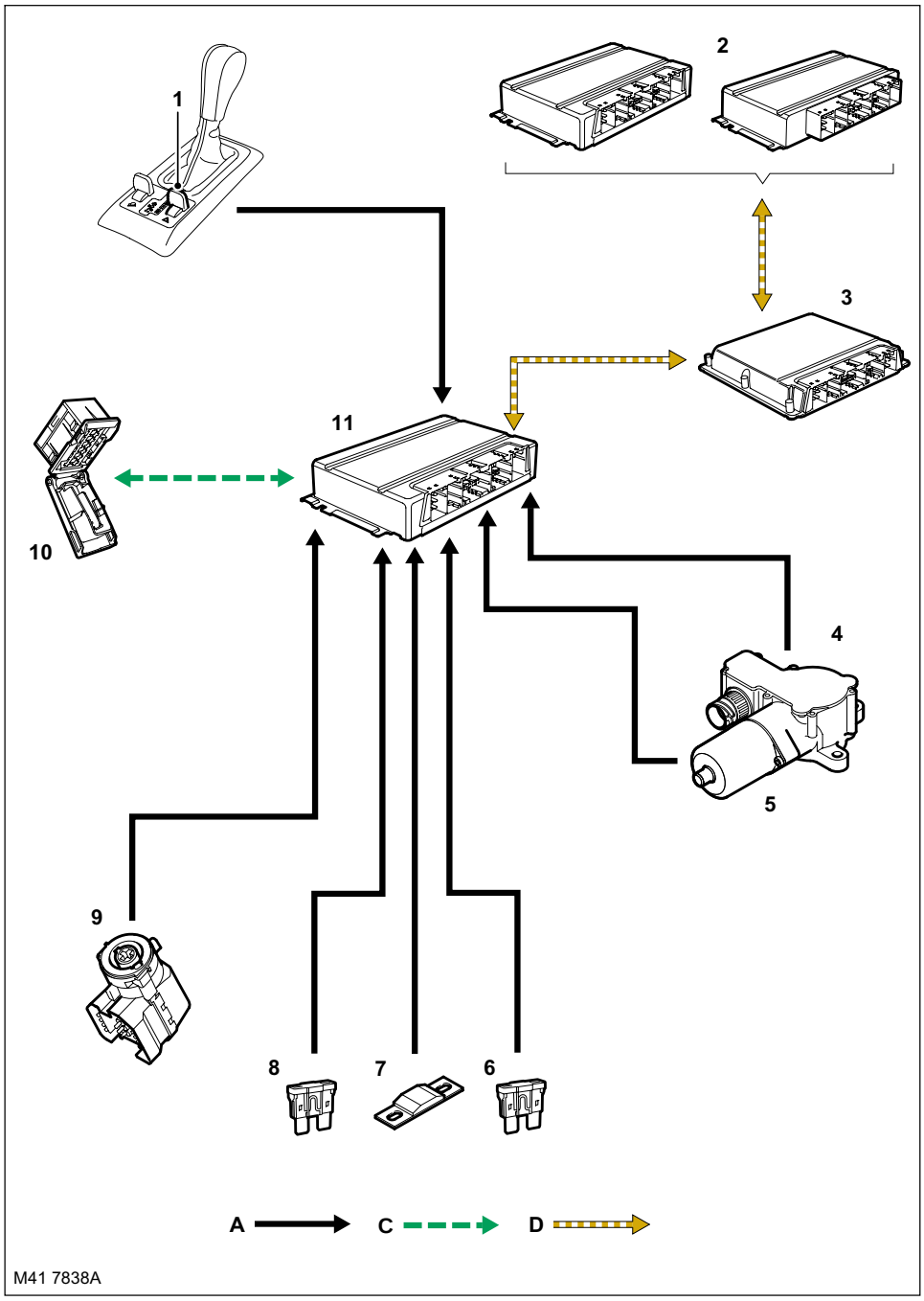
The transfer box ECU uses Diagnostic Trouble Codes (DTC) which relate to transfer box electrical faults.

CONTROLLER AREA NETWORK (CAN) BUS

In the event of a CAN bus failure the following symptoms may be observed:

- Shift from high to low or low to high inoperative
- Instrument pack low range warning lamp inoperative
- Instrument pack transfer box messages in message centre inoperative.

TRANSFER BOX CONTROL DIAGRAM



A = Hardwired connections; C = Diagnostic DS2 bus; D = CAN bus

1. High/Low range selection switch
2. EAT ECU
3. ECM
4. Actuator potentiometer
5. Actuator
6. Fuse 33 Ignition feed
7. Fusible link Permanent battery feed
8. Fuse 37 Neutral selection
9. Ignition switch
10. Diagnostic socket
11. Transfer box ECU

OPERATION

GENERAL

The selection of high/low range is selected by the driver using a switch adjacent to the transmission selector lever. A range change can only be performed when the transmission selector lever is in neutral, position 'N'. The accelerator pedal must not be depressed when a range change is in progress.

If high or low range is requested and the transmission selector lever is a position other than 'N' or 'P', the instrument pack message centre will display 'SELECT NEUTRAL'.

NOTE: *NOTE: With the transmission selector lever in 'P', the range change will not take place and the 'SELECT NEUTRAL' message will not be displayed.*

When low range is selected, the low range 'mountain' symbol will flash when the range change is taking place and then remain illuminated when the range change is complete. The instrument pack message centre will display 'LOW RANGE' for approximately 3 seconds followed by a chime from the instrument pack to confirm that the range change has been completed. Only 'D' and 'Manual mode' are available on the transmission, the 'Sport mode' selection is not available.

When high range is selected, the low range 'mountain' symbol will flash when the range change is taking place and then extinguish when the range change is complete. The instrument pack message centre will display 'HIGH RANGE' for approximately 3 seconds followed by a chime from the instrument pack to confirm that the range change has been completed.

The design of the transfer box allows range changes when the vehicle is moving, within set limitations as follows:

- High to Low – at speeds not exceeding 10 mph (16 km/h)
- Low to High – at speeds not exceeding 30 mph (48 km/h).

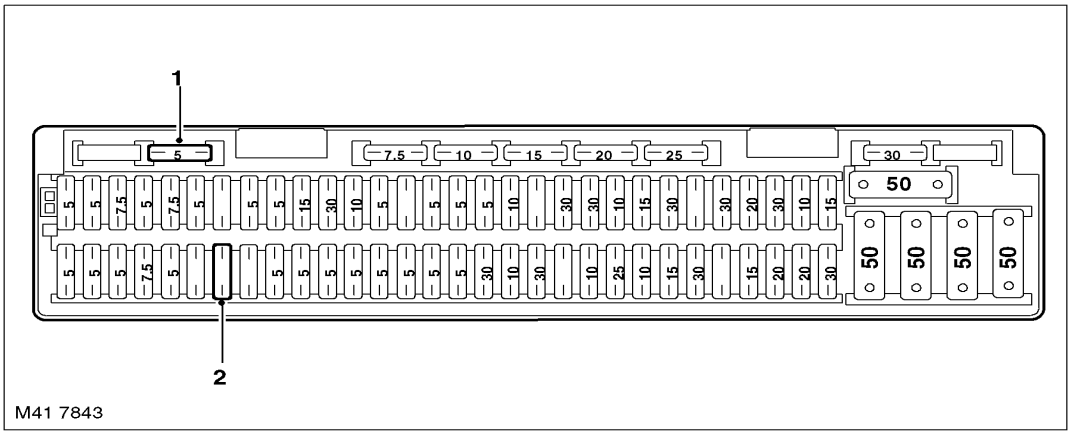
If the vehicle speed is higher than the parameters given above, the instrument pack message centre will display 'SLOW DOWN'. When the correct speed range is reached, the message will be deleted and the range change will commence.

A road speed of less than 2 mph (3 km/h) is interpreted by the transfer box ECU as a static shift (vehicle not moving). In this instance the driver must use the shift lock procedure of operating the brake pedal to allow the selector lever to be moved from 'N' to 'D' after the range change has been performed.

High range should be used for all normal road driving and also for off-road driving across dry, level terrain. Low range should only be required where low speed manoeuvring is necessary, such as reversing a trailer, negotiating steep slippery surfaces or boulder strewn terrain. Low range should also be used for extreme off-road conditions where progress in high range cannot be maintained. Low range should never be used for normal road driving.

NEUTRAL SELECTION

The transfer box can be moved into a neutral position for towing the vehicle. The vehicle must not be towed with the transfer box in high or low range. The transmission must also be in the neutral position. If neutral cannot be selected on the transmission, the vehicle must not be towed.



1. Spare 5A fuse
2. Fuse 37

To engage the transfer box in neutral, switch the ignition to position II and select neutral 'N' on the transmission selector lever. Insert a spare 5 Ampere fuse or greater into the empty fuse position 37 in the passenger compartment fusebox, which is located at the back of the glovebox. Fuse position 37 can be identified using the legend on the fusebox cover.

Once the fuse is installed, the actuator will engage the transfer box in the neutral position.

Once in neutral, the low range 'mountain' symbol in the instrument pack flashes permanently and 'TRANSFERBOX NEUTRAL' is displayed in the instrument pack message centre.

COLD CLIMATE OPERATION

In low ambient temperatures, there may be an increased time delay for the transmission to select neutral. To prevent the transfer box changing range before the transmission has selected neutral, the transfer box ECU contains software to delay the range change.

The transfer box ECU receives a transmission fluid temperature message on the CAN. If this temperature is 5°C (41°F) or below, the transfer box ECU initiates a nominal delay in the range change to allow the transmission to engage neutral. The delay period is dependant on transmission fluid temperature.

HIGH RANGE OPERATION

In high range, the torque input from the transmission is passed to the transfer box input shaft. The position of the synchronizer sleeve couples the shaft directly to the differential housing. The differential splits the torque between the two side gears. One side gear is connected by splines and passes the torque to the rear output flange. The second side gear is connected to the chain drive sprocket and passes the torque, via the chain, to the front output flange.

LOW RANGE OPERATION

In low range, the torque input from the transmission is passed to the transfer box input shaft. The synchronizer sleeve is moved and connects the planetary carrier to the differential housing. The torque from the transmission is now directed through the sun gear of the epicyclic gearset and, via the pinion gears and pinion gear shafts, into the planetary carrier. The annulus gear of the epicyclic gearset is secured inside the casing and generates the low range ratio of 2.69:1. The torque is then passed, via the synchronizer sleeve, to the differential housing where it is split between the two side gears. One side gear is connected by splines and passes the torque to the rear output flange. The second side gear is connected to the chain drive sprocket and passes the torque, via the chain, to the front output flange.

TORSEN® DIFFERENTIAL OPERATION

The input torque from the transmission is passed via the synchronizer sleeve to the differential housing. The torque is then transmitted from the housing, through the three pairs of pinion gears and into the differential side gears.

The side gears have opposite handed helical gear forms and inter-mesh with only one of the pinion gears in each pair. The pinion gears inter-mesh with each other as well as individually meshing with only one of the side gears. Between each pinion gear and the differential housing and on either side of each side gear are friction surfaces or pairs of thrust washers and friction thrust washers. The pairs of thrust washers control the torque biasing function of the differential.

During normal driving, the differential housing rotates at the same speed as that of the input shaft in high range or the planetary carrier in low range. If there is no differential motion between the front and rear propeller shafts, then the differential gear and therefore the side gears will have no relative motion and the whole unit functions as a normal differential.

If the front or rear wheels suddenly loose traction, a large differential motion between the front and rear propeller shafts occurs as the slipping wheels begin to accelerate or spin. In this case with a normal differential, the torque applied to the non-slipping wheels is lost through the differential. With the Torsen® differential, as soon as one wheel begins to slip, the front and rear output side gears are encouraged to rotate at different speeds. With the side gears in constant mesh with their relative pinion gears, and the pinion gears meshing with each other, the differential begins to generate axial and radial thrust loads.

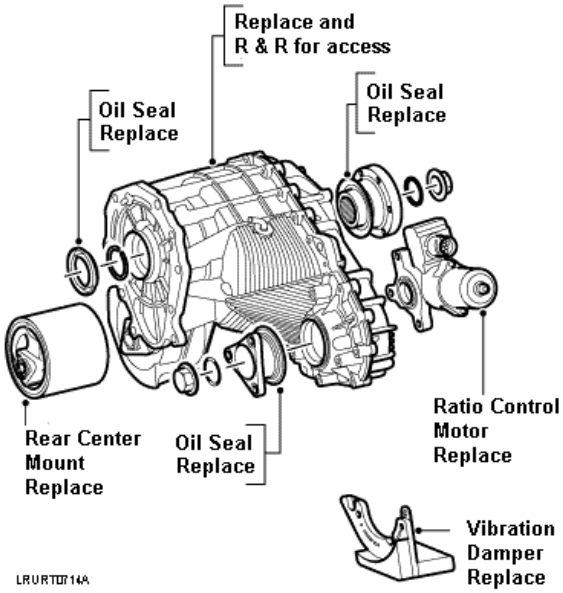
The thrust loads are generated as a result of the helical gear form of the pinion and side gears and they are exerted onto the thrust washers and friction thrust washers within the differential housing. The friction thrust washers generate a resistance to the relative motion and produce a locking effect within the differential. This ensures that the torque is always directed, or biased, towards the propeller shaft with the highest traction and ensures that the vehicle maintains continuous motion on slippery or uneven surfaces. This action takes place progressively and the driver will be unaware of its operation.

REPAIR AND MAINTENANCE

The only allowed fluid specification for the NV 225 transfer box is Castrol BOT26FMB1. Call the Service Help Line or consult the latest Service publications for availability information.

WARRANTY REPAIR OPERATIONS

The repairs below are allowed under warranty as of the date of publication of this training book. Always consult the latest Service Bulletins and Repair Operation guides for current repair and replacement policies.

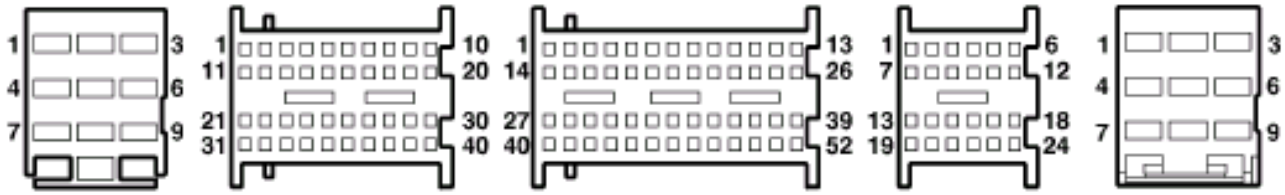


MAINTENANCE SCHEDULE

The maintenance items below are current as of the date of publication of this training book. Always consult the latest Service Bulletins and Service Maintenance Schedules for current intervals, procedures, and fluid specifications.

There are currently no scheduled maintenance procedures for the New Venture Transfer Gearbox.

L322 TRANSFER BOX ECU PIN DETAILS



C1855 C1854 C1319 Not Used Not Used

Connector C1319

Pin No.	Wire Colour	Circuit Description	Circuit Status
7	PU	Neutral request	Batt+ with fuse 37 installed
8	WG	High/Low switch input	0V when High/Low switch pressed
13	YU	CAN bus low	2.4 to 1.5V pulsed
15	GP	Key on power supply	Batt+ with key on
17	WR	Not used	
18	WB	Not used	
19	WP	Diagnostic DS2 line	Batt+ to 0V when diagnostic active
26	YB	CAN bus high	2.5 to 2.3V pulsed

Connector C1854

10	Y	Actuator potentiometer signal	4-4.5V in high - 0-1V in low range
16	B	Actuator potentiometer reference	5V
17	N	Actuator potentiometer ground	0V
19	N	Screen	0V

Connector C1855

2	N	Ground	0V
3	N	Ground	0V
4	RW	Motor A supply/ground	0-Batt+ 3.45kHz during high-low shift
5	R	Permanent battery power supply	Batt+
6	R	Permanent Battery power supply	Batt+
7	RW	Motor A supply/ground	0-Batt+ 3.45kHz during high-low shift
8	N	Motor B supply/ground	0-Batt+ 3.45kHz during low-high shift
9	N	Motor B supply/ground	0-Batt+ 3.45kHz during low-high shift