Vauxhall Cavalier/Opel

Installing the Vauxhall Cavalier 4 x 4 Transfer Box

This procedure assumes the removal procedure has been read and/or followed.
CAUTION: If you followed the removal procedure, the gearbox may NOT have any oil in it - do not forget.

500. Inspect the txb (Transfer box) before reinstalling, Clean off any excess jointing compound.

501. Lightly apply grease to the flange of the txb to gearbox coupling (two visible splined shafts), and apply the rubber 'O' ring to the flange.

502. Apply masking tape (Fig.1B) or similar to the fluid coupling and the txb breather/filler connections to prevent ingress of unwanted material while installing the txb.

503. Clean all set aside bolts in readiness for Loctite fluid when required and loosely place two bolts (Fig.1A) to protect the temp sensor, if fitted, and to tie the cable.

504. Prepare the vehicle by placing a trolley jack ready to lift the txb into position. The jack will need to manoeuvre easily to facilitate mating the txb to the gearbox.

505. If the temperature sensor is not fitted, temporally plug the opening with a length of non-fluffy rag, and insert a grease plug into the two adjacent mounting holes to prevent ingress of dirt. If the temperature sensor is fitted it is recommenced the cabling be coiled up and tied to a loosely inserted mounting bolt. In addition another mounting bolt should be loosely located in the adjacent location to help prevent damage during installation. (£62)

506. Carefully place the txb in position on the trolley jack and manoeuvre to a position below the fitting area.
CAUTION: At no time allow yourself to come between the txb and the ground as the txb is very heavy. You are advised to wear heavy duty gloves while manoeuvring the txb into position, to protect your hands.

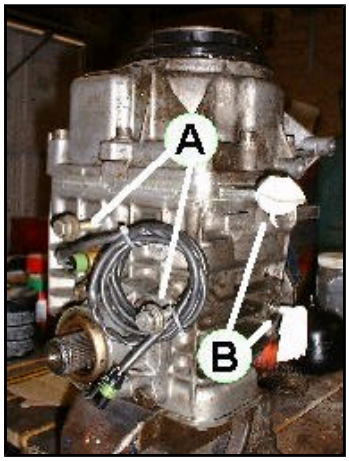


Figure 1

The txb mounted in the vice & prior to installation.

A. 2 mounting bolts loosely inserted to protect the temperature sensor & attach coiled cable.
B. Fluid connections protected by masking tape.

507. Jack the txb into position (Fig.2 & 3) so it can be slid into the gearbox opening. This is a difficult manoeuvre as the rear of the sump is not straight. Angle the txb up at the back so as to insert the propshaft end over the visible torsion bar. Take care not to damage the splined shafts.

508. As the rear of the box gets into position (photo), the front can be tilted into position to allow the box to be slid home into the gearbox opening. This will engage both the drive shaft extension shaft and the txb drive shaft.
CAUTION: It is essential to keep the weight of the txb on the trolley jack as there are no centering sleeves in the gearbox.

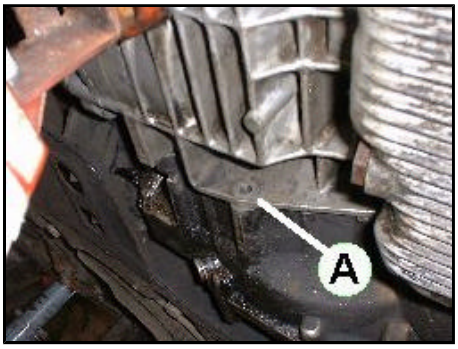


Figure 2

View from underneath the vehicle showing the txb supported by the jack.

A. Lowest bolt.

509. As the txb slides into place, applying Loctite to the mounting bolts and loosely fix with the lowest bolt (Fig.2A) to keep it in position (Fig.4A & B). Once mated to the flange with the previously greased 'O' ring, the weight is not so critical.
NOTE: Of the five lower mounting bolts, the rearmost bolt (not illustrated) is slightly longer than the rest and is the one inserted in the opposite direction to the remaining four.
13mm spanner.

510. Apply Loctite and insert the remaining two lowest bolts, There are two further bolts which will be placed later. (See para. 522)

511. Remove and take away the trolley jack.

512. Apply Loctite and insert the three bolts (Fig.5A & B) at the top of the txb, two short top & front and the longer bolt to the rear. The latter bolts from the gearbox to the txb. Tighten all eight mounting bolts.
CAUTION: Make sure the spanner used is in good condition and a good fit. The 13mm bolts were actually a better fit with a 1/2" AF ring spanner, on the specimen vehicle.
13mm and/or 1/2" AF spanners.

Figure 3

Another view of the supported txb from underneath and looking front to back.

513. Place the starter back into position (Fig.6A). The top bolt includes a bracket to hold the starter cabling in position. Loosely tighten the bolt. It will be removed later to fit the hose bracket.
19 mm spanner.

514. From under the vehicle insert the lower starter bolt and loosely tighten.
17mm + short extension.

515. Re-attach the starter support plate, two small nuts & washers at the starter and one bolt to the engine block, tighten all three mounting bolts and the lower starter mounting bolt.
8mm & 13mm spanners.

516. DC test the temperature sensor. It should read short circuit for the

specimen vehicle. If the temperature sensor was removed then withdraw the temporary cloth plug from the mounting hole and reinsert the temperature sensor with its copper washer. This is further facilitated by removing the adjacent and lower txb to gearbox mounting bolt.
CAUTION: This item is fragile and can be easily damaged - (£62). Keep the cabling from being damaged by twisting.
19mm spanner & DC Test Meter.

517. Using a small piece of wire fish out the grease plug from the two mounting holes of the txb, adjacent to the temperature sensor.
Wire.

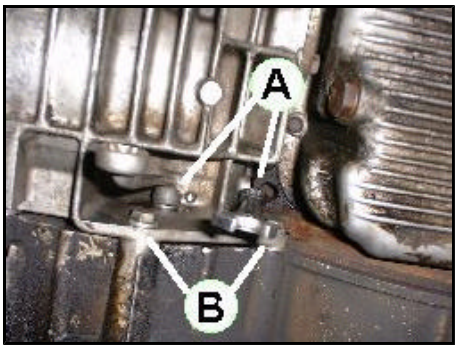


Figure 4

The txb looking up from underneath the vehicle, and with spanners attached to the uppermost bolts. Four of the five lower bolts are visible. The fifth bolt is to the rear, out of view.

A. Spanners attached to two lower bolts, and..
B. the other two bolts.

518. Offer the offside cast support bracket to the txb / engine block. Loctite and Loosely fit the three mounting bolts, bracket to txb.
NOTE: The lower mounting bolt hole will be used for txb oil level checking later.
13mm spanner.

519. Place the two mounting bolts, which are visible, into place - support bracket to engine block. The third mounting can only be accessed with a socket on a short extension bar and includes the bottom mounting of the inlet manifold to engine block support bar. Place the bolt into the bar and manoeuvre into position, use the socket to drive the bolt home. Reach up to the inlet manifold and insert the bolt into the other end of the support bar.
8mm & 13mm spanner.

520. Tighten all six of the txb cast support bracket and the upper bolt of the inlet manifold to engine block support bracket.
13mm & 15mm spanner.

521. Route the temperature sensor cable to the bulkhead by passing it between the steering rack bellows and the torsion bar, and then behind the remaining pipe work to the bulkhead. Locate the connector, towards the nearside and make the connection. Check the slack required for the cable and use cable ties to keep the excess in the bulkhead run. The cable should now be clipped to the cast support bracket. (Fig.8B)
Small cable ties.

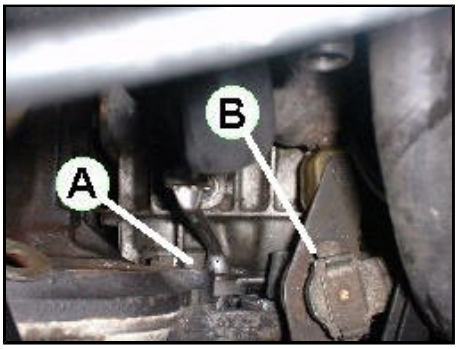


Figure 5

The txb from above, looking down into the engine bay.

A. Spanner attached to upper bolt.
B. the gearchange mechanism.

522. Apply locktite to the remaining two lower txb to gearbox mounting bolts and place in position and tighten. (Five bolts in all - see para. 510)

523. Replace the large bolt engine block to gearbox, adjacent to the upper starter bolt.
19mm spanner.

524. Apply Loctite and replace the three bolts to secure the gear change mechanism into place. The longest bolt is towards the front of the vehicle and of the two shorter bolts, one has a clip associated with it and goes to the nearside of the two. Do not tighten this one fully until the txb fluid pipe is clipped into position.

525. Remove the protective tape from the txb filler/breather pipe connection, clean the pipe and attach to the top of the txb.

526. Remove the protective tape from the txb high pressure connection. Route the high pressure hose to the olive connection, clip the pipe into the clip (para. 524) and temporarily tie the pipe in a vertical position against one of the ABS brake pipes (Fig.7B). Tighten the olive connection and finally tighten the gearbox mounting bolt with the clip associated.
13mm & 17mm, Cable tie.

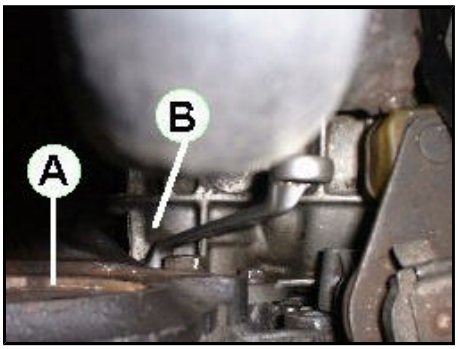


Figure 6

Another similar view of the txb from above and looking down into the engine bay. Shows a spanner attached to the only visible of the three bolts.

A. The starter aperture.
B. Spanner attached to the forward most bolt at the top of the txb.

527. Carefully introduce DEXTRON II ATF fluid to the top of the secured high pressure hose (para. 526 & Fig.7B). Place small polythene bag over the connection and leave. This is to facilitate air rising and escaping (bleeding) from the clutch pressure plate assembly and the associated pipe. Top up as air is displaced.
DEXTRON II ATF Fluid.

528. Start connecting the previous removed connections which improved the working space.
a. Large vacuum pipe, brake servo to inlet manifold - manifold end.
b. Air by-pass hose inlet manifold to by-pass motor valve - manifold end.
c. Inter-cooler hose, inter cooler to inlet manifold - both ends.
d. Lower heater hose to water manifold connection, water manifold end, under inlet manifold.
Screwdriver.

529. Re-check level of DEXTRON II in the high pressure hose and replenish as necessary. (para. 527)

530. Remove the upper most starter securing bolt and refit the multi-hose support bracket. Tighten the starter bolt and insert both heater hoses to the support bracket along with the clutch cable. Refit one end of the

double ended plastic hose clip to the txb high pressure flexible pipe and the nearest heater hose.
19mm spanner.

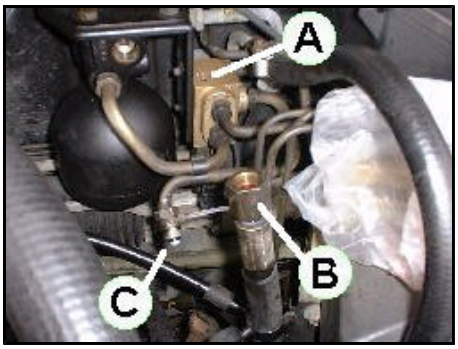


Figure 7

The accumulator area of the txb, Showing the high pressure pipe tied to the ABS system.

A. By-pass bleed screw.
B. txb High pressure hose and ....
C. .... its corresponding connection.

531. Reinstall the offside drive shaft as per the manual, first checking the CV boots - replace as necessary and re-grease. Insert drive shaft into the offside of the txb ensuring it seats properly. Loosely fit the outer end of the drive shaft into the stub axle. Tension the lower wishbone downwards to allow the lower ball joint into position. Tighten the balljoint and apply a new split pin. Refit the axle nut and large plain washer to the shaft and pull it into position.
CAUTION: Be careful tensioning the lower wishbone, it requires some force.
CAUTION: The stub axle nut will be tensioned / tightened when the wheel is on the ground.
17mm spanner, 30mm Long reach socket, split pins.

532. Refit the offside front wheel, without the centre badge to facilitate hub tensioning.

533. Lower the nearside front wheel and place the freed axle stand to the rear offside wheel. This is to facilitate reconnection of the prop shaft to the txb.

534. **NOTE**: If the intermediate propshaft bearings have not been disconnected from the vehicle go to paragraph 537.

535. Loosely refit the rear intermediate propshaft bearing, placing the spacing washers as previously removed. (Removal - para 105 refers)
13 mm spanner.

536. Use the trolley jack to lift the front intermediate bearing in order to offer the propshaft flange to the txb. The handbrake should be off and the gearbox in neutral to facilitate turning of the propshaft & flange, as required.
NOTE: The flanges are 'male & female'.
Trolley Jack.

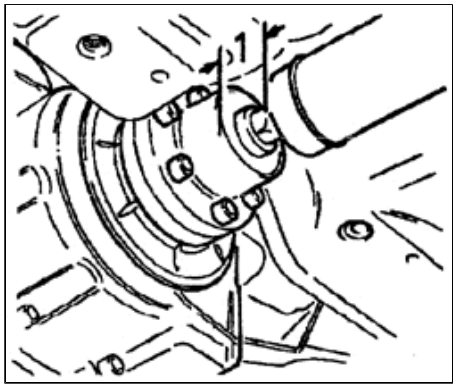


Figure 10

Setting the length of the short front end of the prop-shaft. The measurement '1' on the diagram should be:

30mm plus or minus 2mm

537. (and from para. 534) - Line up the propshaft flanges and loosely insert one bolt only (no washer) to ensure alignment of the two flanges.
CAUTION: Space to work is confined, a telescopic magnet recovery tool will be useful to retrieve dropped bolts.
6 mm Hex Socket.

538. Using Loctite, Insert four of the remaining bolts with the pairing washer plates. Remove the first bolt and using Loctite, install the last pair of bolts with the remaining washer plate. Check the flange seating's are square and tighten the bolts. A screwdriver may be used to hold the propshaft during the tightening process by passing it through the prop joint.

539. If previously removed, continue fitting the front intermediate bearing housing, using the spacing washers as removed. Remove the trolley jack & tighten the bolts.
13 mm spanner.

540. If previously removed, tighten the rear intermediate bearing housing bolts.

541. If previously loosened, the length of the short front shaft must be set to 30mm plus or minus 2mm. Figure 10 shows the measurement to be achieved. (Removal Section - paragraph 122 refers).

542. Check drain plugs are in place, and tightened - gearbox and txb.
8 mm hex.

543. Reconnect the exhaust downpipe.
13 mm socket.

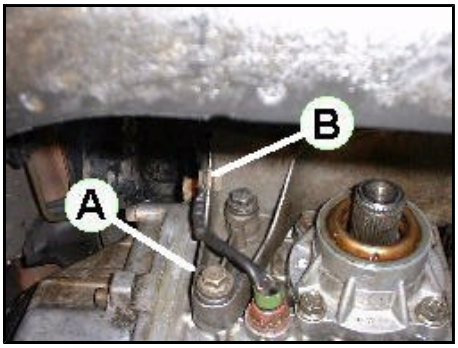


Figure 8

The offside of the txb from underneath, showing the position of the mounting bolt used for level checking.

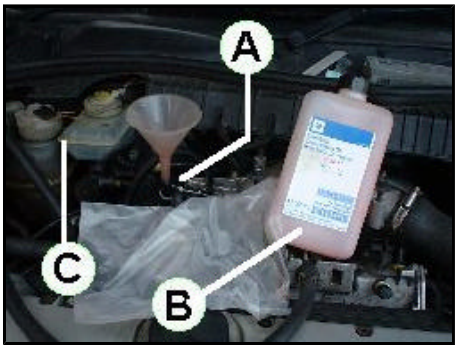
A. Lower mounting bolt, used for oil level checking.
B. Cable support clip.

544. Lower the vehicle from the axle stands.

545. Tension and split pin the centre hub nut according to the 'Haynes' Workshop Manual (UK).
CAUTION: SAFETY REQUIREMENT - DO NOT OVERLOOK.

546. Check and adjust the level or refill the gearbox oil. This can be facilitated with a tube. e.g. the txb filler/breather tube and a very small funnel. Place a drip tray under the gearbox and remove the level plug, from the side of the gearbox. It is adjacent to the inner drive shaft CV. Remove the plastic plug and plug from the top of the gearbox, insert the tube, with funnel, and fill to level. Replace all plugs and caps.
NOTE: Refers to specimen vehicle with 6 speed gearbox.

CAUTION: The level plug is NOT the 8mm plug at the FRONT of the gearbox.
CAUTION: GM Synthetic Oil carries a handling / health warning.
Gearbox Oil - GM Part No: 90540998.



547. If not already, reconnect the filler/breather pipe to the top of the txb and insert the very small funnel into the end of the tube. The lower txb mounting bolt adjacent to the txb temp sensor should be removed and a drip tray placed into position. Fill the txb (approx. 600 ml) until fluid has ceased to flow from the lower mounting bolt hole. Locktite and replace the mounting bolt and tighten. Ensure the filler tube is routed away from moving/hot parts. The top of the tube should be turned over, without kinking, and lodged beside the water header tank. It is important the tube is without kinks and can properly act as a breather (Fig.9C)
CAUTION:GM synthetic Oil carries a handling / health warning.
Synthetic Transfer Box Oil GM Part No: 90443530.
Drip Tray.

Figure 9

View of the offside rear bulkhead and the funnel set up, to fill the txb through the filler / breather pipe.

A. Funnel inserted into restrained filler pipe.
B. The 600ml bottle of GM synthetic oil.
C. The water header tank, behind which the filler pipe is stowed in normal service.

This procedure assumes the removal procedure has been read and/or followed.
CAUTION: If you followed the removal procedure, the gearbox may NOT have any oil in it - do not forget.

550. Bleeding - the steering hydraulic system.

If installing the txb, reconnect battery and prepare to bleed the power steering / txb hydraulics system.
GM recommends the front wheels are off the ground for bleeding the steering system

551. Switch on ignition and pump brake pedal at least 25 times or until any 'whooshing' in the accumulator stops. Switch off ignition and remove fuse 19.

552. Open the bypass screw (Fig.7A) 3 turns on the top of the accumulator control block (photo).
3mm hex.

553. Fill the steering reservoir with DEXTRON II to the max. mark. Leave the reservoir cap off.
DEXTRON II - (approx. 1 Litre to fill system).

554. Start engine and immediately replenish the falling level to the minimum mark. Continue to run the engine for five minutes.

555. With the engine still running, turn the steering to each stop and hold for five seconds. Repeat a number of times. Close the by-pass screw for 20 seconds and then open again for another 20 seconds and finally close. Switch off the engine and insert fuse 19.

556. Switch the ignition on but do not start the engine. Operate the brake pedal 25 times. This recovers fluid from the accumulator back to the reservoir. Recheck the fluid level and adjust as required. Recheck by-pass screw is closed.

557. Restart the engine and run for approximately one minute. Stop the engine. Turn the ignition on again, operate the brake pedal 25 times and recheck the reservoir oil level again. Replace reservoir cap.
NOTE: If only Bleeding the system - stop here else go to para. 560

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560. Check water level.
CAUTION: Water may be hot.

561. Check for any visible hydraulic oil leaks round the txb and the associated high pressure pipes etc.

562. Replace the inlet manifold cover and secure with the four hex bolts.
5mm hex.

563. Complete the safety check list and road test the vehicle.

564. SAFETY CHECKS

Front O/S hub nut - tensioned & pinned.
Wheel Nuts - tightened.
Exhaust downpipe - replaced & tightened.
Txb high pressure hoses - replaced & tightened.
Drain Plug - txb.
Drain Plug - gearbox.
Oil level - gearbox.
Oil level - txb
txb temperature sensor connected.
Steering Oil system charged, bled and level checked.
Prop. Shaft Connected - intermediate bearing mountings in place - splined joint cap tightened.
Water Level checked.
Brake servo vacuum pipe connection.
Axle stands removed.
Final visual check with engine running.