

# JACKAROO 3000 TURBO DIESEL

## Diagnostic Trouble Codes P1485/P1486

### Flash Code 74 – ITP Failure.

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The Jackaroo 4WD Club of Australia (NSW) acknowledges that this article was first published in the September 2009 Newsletter of the Jackaroo 4WD Club of Victoria and is reproduced here as a service to owners of the above model Jackaroo.

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If your Jackaroo has done 130, 000 kms then chances are that the Intake Throttle Position sensor (ITP) has failed.

The ITP (sometimes called the TPS) deteriorates gradually. The symptoms are:

- Irregular stumbling at cruising speeds
- A slight hesitation during acceleration and
- Poor fuel consumption

The fault may be recorded in the Engine Control Module (ECM) and may initiate the Malfunction Indicator Lamp (MIL) on the instrument panel.

But more likely, the fault will need to be extracted using the Tech 2 test unit (as used by your Holden dealer, or other workshop), or by reading the Flash Codes from the MIL.

The ITP is an electrical potentiometer on the rear (firewall) end of the throttle shaft. On the other end is the throttle motor.

As the accelerator pedal is depressed, the stepper twists the shaft opening the throttle. The ITP reports the throttle position to the ECM, which then adjusts the fuel mixture.



As the ITP wears out, the position signal is not sent back to the ECM (in some throttle positions) and the ECM then has to adjust the fuel mixture using the other sensors.

This causes the stumble.

The actual ITP failure occurs as the wiper arm wears through the track and this, coupled with the gradual ingress of unburned fuel through from the throttle shaft bearing, results in irregular resistance of the potentiometer.

To confirm the ITP failure, you can measure the resistance as the throttle is operated. With the ignition OFF, remove the hose from the intercooler to the throttle.

This allows access to the connector.

Disconnect the connector and connect an ohm-meter between the wiper centre terminal and either of the other two.

Slowly move the throttle butterfly from fully open to closed. Note the change in resistance from about 900 ohm to about 5000 ohm.

If the resistance jumps high, or open circuit at any point in its rotation, then the ITP has clearly failed.

The ITP may be replaced by your Holden dealer (at considerable cost), or you can do it yourself at a lesser cost.

The ITP, Isuzu part No. 8-9737285-0, costs about \$160.00, an outrageous price for an item that probably costs \$1.00 to manufacture. But it's necessary for the job.

To replace the ITP, it is necessary to first remove the throttle body:

1. Remove the two bolts holding the left side of the intercooler to the frame mount
2. Remove the two bolts holding the frame mount and remove the frame mount
3. Disconnect the connector to the throttle motor
4. Remove the harness connector from the side of the throttle body
5. Release the throttle body and lift it, with the motor and ITP, up off the manifold
6. Mark the position of the throttle motor (paint or scratch a mark) before removal. Clean it internally with methylated spirits and dry
7. Mark the position of the ITP before removal
8. Remove the 0-ring seal and clean the ITPS mounting
9. Clean the butterfly and the internal throttle body
10. Refit the throttle motor
11. Fit a new 0-ring and ITP. Set the ITP to the mid-point of adjustment
12. Reconnect the harness to the throttle motor and ITP

It is now necessary to adjust the position of the ITP. With the ignition ON and the engine OFF:

- Close the throttle butterfly while measuring the voltage between the black/white wire and the grey/black wire by carefully inserting a pin through the insulation into each wire.

Use an accurate digital voltmeter for the measurement

- Adjust the ITP position to give a voltage reading of about 0.85V
- Turn the ignition off, ensure all surfaces are clean
- Remount the throttle body (replace gaskets if necessary), refit the hose and intercooler
- Tighten the two throttle body mounting nuts to 20Nm (14lbft)

Using the Tech-2 computer, your Holden dealer is able to check on the operating position of the ITP while the engine is running.

The typical value during idle should be within the range 3.1 to 3.9V and 0.2 to 0.9V at 2500rpm.

This voltage can be measured with a high impedance digital voltmeter by retaining the connection to the ITP used in the static setup above. However, this is very difficult to access with the turbo boost hose in place.

You can make a new connection to the black/ white and grey/black wires at the ECM. This requires the

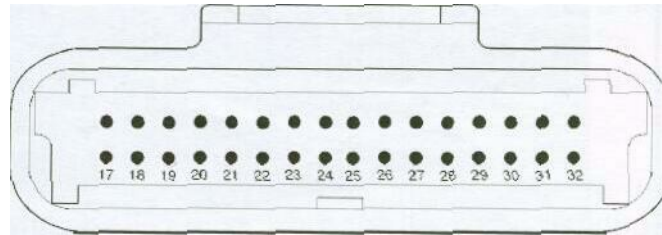
removal of the rubber cover from each of the two larger connectors and opening the connector shells to access the wires.

Connector J1 (red) is on the right hand (engine) end of the ECM. Connector J2 (blue) is in the middle of the ECM.

The smaller connector is the power supply to the ECM.

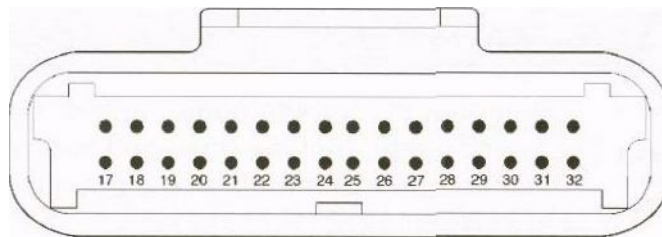
The following pinouts are of the sockets on the ECM. The term *Lower* used in the labels refers to the lower strip (17 - 32) of the terminal pins.

**ECM Pinout Table, 32-Way Connector - J1 RED - Lower**



The grey/black wire terminates on pin 18 of J1.

**ECM Pinout Table, 32-Way Connector - J2 BLUE - Lower**



The black/white wire terminates on pin 26 of J2.

Gently push a pin through the insulation of each and measure the voltage between them at idle and 2500 rpm.

If it is outside the ranges mentioned earlier, gently turn the sensor to get the values within range and tighten the mounting screws.

Note that it is somewhat difficult to reach the ITP mounting screws and a small socket spanner, or very small hand spanner, will be required. But it can be done!

Go for a run in the Jackaroo and check for smoother running.

Check the MIL Flash Codes to see if Flash Code 74 is still retained in the ECM memory at the end of the journey.

After starting and stopping over some tens of runs, the code may be erased automatically.

If not, lift off the smaller connector on the left hand side to the ECM for at least 30 seconds to erase the fault records. Replace the connector and recheck the fault codes.

Finally, it appears the ECM may take a number of runs to fully recognize the new ITP and adjust its "brain" accordingly. So be patient.