Automatic Level Control Circuit Description

Auto Level Control (ALC)

The function of the Automatic Level Control system is to maintain a constant trim height at the rear suspension when
the vehicle is loaded beyond a predetermined amount. An inflator system is included as part of the overall Automatic
Level Control system. The function of the inflator system is to provide pressurized air up to 481 kPa (70 psi) to an
inflator fill valve for inflating items other than the vehicle’s air shocks, such as sports balls, bicycle tires, automobile
tires, etc. Voltage is applied to the compressor relay, exhaust solenoid, height sensor, and inflation timer relay, allowing
the system to operate with the vehicle ignition switch in the ON or ACCY position.

Loading The Vehicle

As a load is added to the vehicle, the vehicle body lowers causing the height sensor arm to rotate upward. If the body
lowers enough such that the sensor arm rotates above the in-trim zone, the height sensor closes switch B and activates
the internal timing circuit. If the vehicle maintains this condition for more than the minimum delay of 17--27 seconds,
the height sensor closes switch C, completing the compressor relay circuit to ground. The compressor then supplies
compressed air through the air dryer and air lines, to the air shocks.

As the air shocks inflate, the vehicle body raises, causing the height sensor arm to rotate downward. Once the height
sensor arm reaches the in-trim zone, the height sensor opens switch B, opening the compressor relay circuit, and
shutting off the compressor.

Unloading The Vehicle

As a load is removed from the vehicle, the vehicle body raises, causing the height sensor arm to rotate downward. If the
body raises enough such that the sensor arm rotates below the in-trim zone, the height sensor closes switch A and
activates the internal timing circuit. If the vehicle maintains this condition for more than the minimum delay of 17--
27 seconds, the height sensor closes switch C, completing the exhaust solenoid circuit to ground. With the exhaust
solenoid energized, compressed air exhausting from the shocks, through the airlines, air dryer, exhaust solenoid, and air
filter, and the vehicle body begins to lower.

As the vehicle body lowers, the height sensor arm begins to rotate upward. If enough load remains in the vehicle, the
height sensor arm may reach the in-trim zone, causing the height sensor to open switch A, opening the exhaust solenoid
circuit. This de-energizes the exhaust solenoid and prevents further air from escaping the system. If very little or no
load remains in the vehicle, the height sensor arm may not reach the in-trim zone. In this case, the height sensor opens
switch C (de-energizing the exhaust solenoid) after the electronic timer expires, approximately 5 ½ minutes. This timer
prevents continuous energizing of the exhaust solenoid, and is reset by turning the ignition switch to OFF or RUN, or
whenever the sensor arm remains above the in-trim zone for 17--27 seconds or more.

In case of a system leak, a similar timer prevents continuous operation of the compressor by opening switch C after 5
½ minutes. This timer is reset by turning the ignition switch to OFF or RUN, or whenever the ignition switch is in the
RUN position and the sensor arm remains below the in-trim zone for 17--27 seconds or more.

Head Relief Function

Prior to every activation of the compressor motor, the height sensor closes switch A and C, energizing the exhaust
solenoid for approximately 1 second to relieve the pressure in the compressor head. This prevents the compressor from
trying to start against a high head pressure, drawing a high current, and potentially stalling and blowing the ELC and/or
MALL/RADIO/DIC fuse. This cycle is controlled by the height sensor and will not occur if the sensor is already in the
exhaust mode (sensor arm below the in-trim zone).

**Air Replenishment Cycle (ARC)**

Approximately 40 seconds after the vehicle ignition switch is turned to RUN, the height sensor closes switches B and C for 3 to 5 seconds, operating the compressor. If this rotates the height sensor arm below the in-trim zone, the height sensor will then close switch A and C until the arm is back in the in-trim zone. This cycle ensures that the minimum system pressure of 55 to 97 kPa (8 to 14 psi) is replenished in the air shocks. The air replenishment cycle is controlled by the height sensor and will not occur if the sensor arm position is above the in-trim zone, indicating that additional pressure is needed in the air shocks to raise the vehicle. In this case, the compressor runs after a 17--27 seconds delay, and will run as long as needed.

**Inflator**

A provision is made to use the compressor to inflate tires, etc. The inflation equipment consists of the auto level control inflator relay, inflator air switch and auto level control inflator solenoid valve. When the inflator air switch is turned to ON, circuit 1245 is grounded. This energizes the inflation timer relay. The inflation timer relay then connects circuit 1249 to voltage, energizing the inflator solenoid, and grounds circuit 321, energizing the compressor relay. These actions divert compressed air to the inflator fill valve rather than to the air shocks. The compressor will continue to run for up to 10 minutes or until the inflator OFF switch is depressed, opening 1245. After approximately 10 minutes of run time, the inflation timer relay will automatically shut off the compressor by opening circuit 1245 and circuit 321. Circuit 1248 is then opened, de-energizing the inflator solenoid and reopening the air path to the air shocks. If the inflation timer relay timer shuts the compressor off in this manner, the system may be restarted by depressing the inflator ON switch.