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2002 JEEP Cherokee/Liberty OEM Service and Repair Workshop Manual

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Type of External Input Faulted or Providing Invalid Data	AEB Action
Vehicle dynamic data This includes yaw rate, longitudinal acceleration, steering angle input and wheel speed.	AEB system is disabled. Indication is provided when the AEB is enabled and each time the AEB ON button is pressed. DTC is set as soon as a fault is detected
Brake sensor/ brake pedal position	AEB system is disabled. Indication is provided when the AEB is enabled and each time the AEB ON button is pressed. DTC is set when the AEB is enabled or the FCW ON button is pressed.
Engine - PCM	Faults in the engine will not prevent the AEB from requesting braking.
Transmission	Faults in the transmission have no effect on the AEB system.
IPC	AEB system is disabled. Indication is provided when the AEB is enabled and each time the AEB ON button is pressed. DTC is set when the AEB is enabled or the FCW ON button is pressed.
LRCF	AEB system is available with limited functionality. Braking on stationary objects is disabled. Indication is provided when the AEB is enabled and each time the AEB ON button is pressed. DTC is set when the AEB is enabled or the FCW ON button is pressed.
Electronic Park Brake (EPB)	Faults in the EPB system have no effect on the AEB system.
Cruise Control Switches	Faults in the cruise control switches have no effect on the AEB system.
Temperature sensor / indicator	AEB system is never disabled. No indication is provided.

Input/Output Communications To System CAN ECUs: CAN-FD-2, 3, 8, and 14

		Target acceleration/deceleration for any feature
		PEB settings.
		Prefill command and status of Brake System
		An intervention occasion.
	DTCM	Transfer case range status.
	IPC	FSFCW Activation Mode setting
		Total odometer value.
		Pedestrian Emergency Braking Warning & Active Braking setting
	PCM	Actual pedal position.
	RADIO	Drivers request setting of the FSFCW.
		Pedestrian Emergency Braking Warning & Active Braking setting request.
	TCM	Current gear in use.
		Gear display for the IPC.
CAN-FD-8	Radio	This signal is managed when the driver request a setting of FSFCW
		Pedestrian Emergency Braking Warning & Active Braking setting request.
		This signal is managed when the driver request a setting of FSFCW.
CAN-FD-14	BSM	All wheel speed status, pedal state, rolls, pulse counter, failure and controller status.
		Lateral acceleration signals and values.
		Yaw rate signals and values
		Stand still condition.

The system is not likely to detect correctly if:

- Most of the animal body occluded.

Adversely the system may incorrectly detect something as an animal if:

- The heat signature in the image is similar to that of the shape of an animal. Some examples of these types of structures are sometimes found on various object such as warm stones, parts of buildings, parts of vehicles or street lights.

PEDESTRIAN DETECTION -

The system is highly likely to detect a pedestrian correctly if:

- The head of the pedestrian is visible.
- The pedestrian is in an upright pose: standing still or moving.
- Most of the body is visible.
- Distance to the pedestrian is between 8 meters (26 ft.) and 90 meters (295 ft.) for a 170 cm (5.5 ft.) adult.

The system is highly likely to detect correctly even if:

- Other objects such as a vehicle, baby carriage, dog, etc. are close to the pedestrian.
- Many pedestrians are walking close to each other in a group. The algorithm most likely detects the most visible pedestrians (which are not occluded by others) in the group or the ones who are most separated from the group. In consequence, the most 'dangerous' pedestrians are detected.
- The object is a cyclist, and the cyclist is in an upright pose similar to a pedestrian.

The system is not likely to detect correctly if:

- Head of pedestrian/cyclist is not visible. For example, head is covered by an umbrella or a helmet.
- Pedestrian is bending, sitting down, on knees, lying etc. Cyclists leaning forward on the bike will most likely not be detected correctly.
- Most part of body is occluded.

The system may incorrectly detect something as a pedestrian if :

- The structure and heat signature in the image is similar to the shape of a human. Such structures are sometimes found on various objects, for example parts of vehicle tires, house facades, street lights or vehicle back lighting.

WARNING FUNCTION -

All detected objects will get a yellow enclosing box to highlight it in the image. Objects which are evaluated to be at risk will change color to a red box and a Controller Area Network (CAN) message is transmitted for the alert which can also be used to trigger other warning systems in the vehicle like sound alerts, symbols in the HUD or a combination of these. The message will contain information about what type of object (animal, pedestrian) it is and on which side the object is located (left, center, right).

IMAGE ENHANCEMENT -

When the vehicle is moving forward and above the calibrated speed of 13 km/h (8 mph) the NVPM will overlay:

- Red highlights around detected pedestrians when detection status is pedestrian level 2.
- Red highlights around detected animals when detection status is animal level 2.
- Yellow highlights around all detected pedestrians when detection status is pedestrian level 1.
- Yellow highlights around all detected animals when detection status is animal level 1.

When the vehicle speed is below the minimum speed and no forward movement is detected by the vehicle speed sensors the NVPM will overlay:

- Yellow highlights around detected pedestrians when detection status is pedestrian level 2.
- Yellow highlights around detected animals when detection status is animal level 2.
- Yellow highlights around all detected pedestrians when detection status is pedestrian level 1.
- Yellow highlights around all detected animals when detection status is animal level 1.

Anti-Tamper Management -

The NVPM will be in an anti-tamper state when the Vehicle Identification Number (VIN) or the NVPM serial number is not programmed or is mismatched. Only new modules can learn the VIN if anti-tamper is set. When anti-tamper is active the NVPM transmits default values for chime request, tell tale request, temporary display request message and night vision alert telltale display. Refer to the NVCM for further detail.

NVPM Heater Management -

The NVCM activates the heater when internal module set conditions are met and the ignition is in the **RUN** position.

Related ECUs and their associated signals:

NOTE

(*) information from ECU not connected to this specific CAN. The BCM is the gateway used for the signals between the CANs listed below.

Security Gateway Module

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The SGW gates multiple signals from CAN-FD to CAN-C1.

NIGHT VISION SENSOR BLOCKAGE ANALYSIS

NOTE

FOREIGN
DEBRIS



POOR LIGHTING
NV DISPLAY



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5. Note the location and orientation of the vehicle (i.e. facing a wall) will affect the NV images displayed in the IPC.

* Relocate the vehicle as needed.*

6. Note the conditions of the vehicle surroundings (i.e. lighting, debris) will affect the NV images displayed in the IPC.

* Change the vehicle surroundings (better lighting, clean the camera) as needed. *

4. Testing for blockage.

1. Before continuing, make sure the NV function is enabled / turned on for the IPC.

2. Change the PRNDL position from Park to Drive (or Reverse then to Drive).

3. Test drive the vehicle at speeds above 8.94 mph or 14.4 kmph (up to 30 minutes) - DO NOT CYCLE THE IGNITION - when finished with the drive.

4. Did the IPC display a message for "Sensor Blocked"?

Yes

- Park the vehicle, note the amount of time driven on the repair order.

	TCM	Transmission shift lever position.
LVDS	NVPM	Images from the night vision camera.

Sample

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The BCM performs the gateway function from the CAN-FD2 to the LIN, the LIN to the CAN-FD2, the CAN-FD2 to CAN-FD3, the CAN-FD3 to the CAN-FD2 and the CAN-IHS to CAN-FD2.

BCM - If there is a loss of communication between the CVPAM and the BCM, the BCM will set LED control signal to "SNA".

Brake System Control Module (BSCM)

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The BSCM is responsible for providing the CVPAM with several outputs that help determine the radius of the trajectory travelled by the vehicle.

The BSCM manages the autonomous braking warning function based upon the distance to detected obstacle at the front or rear of the vehicle signal sent by the CVPAM.

The BSCM requests illumination of the brake lamps when the BSCM applies the brakes.

Central Vision Park Assist Module (CVPAM)

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The CVPAM signals from the EPS system to determine if the vehicle is travelling in a straight or a curved path and signals from the BSCM to determine the radius of the trajectory travelled by the vehicle.

The CVPAM manages the steering wheel angle by interfacing with the EPS module control of the Torque Overlay Interface (TOI). When the CVPAM sends a request for TOI, the steering control and the strategies to perform a parking maneuver are activated. During maneuvering, the CVPAM continues to check that all conditions are satisfied for PPPA operation and monitors the vehicles lateral displacement. this check is a correlation between x- and y- coordinates of the planned vehicle position on trajectory and the calculated position of the vehicle based on wheel signal pulses and vehicle angle.

When the reverse gear is engaged the CVPAM sends a torque overlay request to the EPS module. Once the CVPAM receives a confirmation response from the EPS module, the EPS module will enable a switching process that allows the steering column torque to be applied. When an increase or decrease in steering wheel angle is being requested by the CVPAM the steering wheel angle will increase or decrease as a result of torque applied by the EPS.

The CVPAM receives a gated BCM request since with the intent of monitoring the switch status and appropriately switching the PPPA system ON/OFF. The CVPAM acknowledges a valid switch input at any vehicle speed. If the BCM recognizes a switch ON/OFF request equal to or greater than 60 seconds, a DTC is set for switch stuck on and the CVPAM will request the IPC to display the appropriate message to the customer.

4.	Body Control Module (BCM)
5.	Instrument Panel Cluster (IPC)
-	Auxiliary Switch Bank Module 2 (ASBM2)

The Front and Rear Parking Assistance (FRPA) with Stop & Release System detects objects located in front of the vehicle and behind the vehicle (within defined coverage zones), and provides an autonomous braking warning (i.e., brake and release) in REVERSE gear only for objects detected at the rear of the vehicle. The FRPA with Stop & Release System is intended to warn the driver and apply the brakes in order to assist the driver in preventing vehicle contact with an object detected at the rear of the vehicle. When an object is detected, the FRPA with Stop & Release System provides an alert to the customer based on the selected customer configuration and the object's location and distance relative to the vehicle. The system assists the driver during parking by sensing obstacles situated outside the driver's field of view.

The information regarding the presence and distance of an obstacle is transmitted to the driver in the form of an audible alert and graphic display. The audible alert shall be pulsed at a rate dependent on distance to the obstacle.

OPERATION

The FRPA is enabled and provides alerts to the customer when the following conditions are true:

1. Vehicle is in **R** everse or **D** rive gear.
2. Vehicle speed is below 11 kmh (7 mph).
3. The ignition is in the **RUN** position.
4. The PAM system is turned **ON** .

The FRPA with stop and release system is operational under the following conditions:

1. The vehicle is equipped with an Automatic Transmission.
2. Vehicle is in **R** everse or **D** rive gear.
3. Vehicle speed is below 11 kmh (7 mph).
4. The ignition is in the **RUN** position.
5. The transfer case is in the **LOW** position.
6. The IPC is configured for the proper display indicators for this system.

Auxiliary Switch Bank Module 2 (ASBM2)