

NEWER TOYOTA TPMS: PRESSURE / POSITION DISPLAYS

Technician reference | Based on fifth-generation RAV4 / RAV4 Hybrid (2019-2025) Toyota service information

Three different operations: Pressure **initialization** establishes the low-pressure warning reference; **position identification** assigns each transmitter to a wheel; **ID registration** tells the ECU which transmitters belong to the vehicle.

1 System overview

In the RAV4 reference system, each valve-stem TPMS transmitter contains a pressure/temperature sensor, transmitter, unique seven-digit hexadecimal ID and nonreplaceable lithium battery (about 10 years of service life). Data is sent at 314.98 MHz to the TPMS ECU/receiver. Equipped vehicles display pressure by wheel position. A full-size spare may have a fifth monitored sensor, though spare pressure is not shown on the individual tire display. [1, 3]

On the reference RAV4, broadcast frequency is about once per 90 seconds when stationary and four times per minute while driving; displayed readings may lag behind actual tire-pressure changes. [3]

2 How the car identifies tire positions

For the RAV4, the TPMS transmitter sends its ID and rotational-period information. The skid control ECU provides individual ABS wheel-speed pulse signals. The TPMS ECU correlates these signals to match each transmitter to LF, RF, LR or RR. It does not need a separate RF receiving antenna at each corner. The NCF does not disclose the exact correlation algorithm. [2]

On the RAV4, position assignments can be written with a scan tool or learned automatically while driving at 25 mph (40 km/h) or more for about 10-30 minutes. Tire pressures may display as dashes until learning is complete. [2, 4, 5]

3 Required operations after common service

Service operation	Required action / technician note
Adjust pressure to existing specification	Inflate cold tires to the specified pressure; ordinarily no ID registration or initialization is needed. Allow time for the display to update.
Rotate tires Same specified pressure, front and rear	1. Set all tire pressures to specification. 2. Start position identification (on 2024 RAV4 HV, use TPWS > Set Pressure). 3. Note on RO: advise customer that tire-pressure values may show dashes until learning completes.
Rotate tires Unequal specified pressures, front and rear	1. Set pressures to the specifications for their new locations. 2. Perform pressure initialization. 3. Start/confirm position identification (automatically begins with Set Pressure on 2024 RAV4 HV). 4. Note on RO: advise customer that tire-pressure values may show dashes until learning completes.
Change specified tire pressure Tire size, type, load, etc.	Initialize the TPMS warning-pressure reference at the applicable new specified cold pressure.
Replace any TPMS transmitter	Register all transmitter IDs (including unchanged sensors), then initialize the warning pressure and verify wheel assignments. Automatic ID registration may be available.
Replace TPMS ECU / receiver	Register transmitter IDs, initialize pressures, then verify wheel-position assignments.

2024 RAV4 Hybrid clarification: Toyota requires TPWS initialization after each rotation. On this vehicle, **Set Pressure** both initializes the warning reference and starts automatic wheel-position identification - it is not a second separate command. The TPMS warning light flashes three times on initiation; individual pressures may show dashes until learned. [5]

4 Reset, registration and position-identification workflow

A. Pressure initialization (steering-wheel controls)

Set the cold tire pressures correctly. With vehicle stationary and power on/READY as specified in the applicable owner's manual, navigate to **Vehicle Settings > TPWS > Set Pressure** and hold OK. The warning lamp flashes three times to acknowledge initiation. The ECU then collects transmitter readings. On 2024 RAV4 HV, this action also initiates position identification. [2, 5]

Do not confuse: The three flashes indicate the command was accepted, not that all pressures and positions have been learned. **Change Wheel** is for transmitter ID registration / tire-set change, not a routine tire rotation. [4, 5]

B. ID registration after replacing a transmitter

Before removing sensors, record all registered transmitter IDs. After installing the new sensor, use GTS+/Techstream **Chassis > Tire Pressure Monitor > Utility > ID Registration/Tire Number Registration** to register the complete set of IDs. Then initialize pressures and confirm wheel assignments. Equipped variants offer automatic ID registration following an initiated registration operation and driving. [1, 3, 4]

C. Automatic wheel-position identification (standard rotation workflow)

Start the specified initialization/position-learning procedure, then allow normal customer driving to complete wheel-location learning (typically 25 mph or more for 10-30 minutes, including turns). Displayed pressures may temporarily be dashes. Record the explanation on the RO; a continuous flashing/illuminated TPMS malfunction light is **not** the expected normal wheel-position-learn indication. [4, 5]

Suggested RO note: "TPMS tire-position identification initiated after tire rotation. The tire-pressure display may show dashes until automatic learning completes during normal driving."

D. In-bay manual Tire Position Write - exception procedure only

Use only when automatic learning fails during customer driving, or the wheel positions must be verified before vehicle delivery. This is not a standard tire-rotation step. [4]

1. At each mounted wheel, use the **XtraSeal TPMS tool** to activate/read the transmitter ID, and record **ID + physical corner** (LF, RF, LR, RR).
2. Connect **GTS+/Techstream: Chassis > Tire Pressure Monitor > Utility > Tire Position Write**. Alternatively use the **Autel** only if its Toyota-specific diagnostic menu provides the equivalent function.
3. Match the IDs to those registered in the TPMS ECU, write their current wheel positions, then confirm pressures appear at the correct corners.

Shop adaptation: Using the XtraSeal tool to identify ID/location replaces Toyota's documented pressure-reduction ID-identification method; it assumes the tool can reliably read the installed IDs. Autel MS906 support for Tire Position Write has not been verified. If pressure initialization is required, perform it **before** manual writing so the learned assignments are not cleared. [4]

5 Troubleshooting and service notes

Warning lamp: Steady light: low pressure. Blinks for about one minute then remains illuminated: system malfunction - read TPMS DTCs. During normal post-initialization position learning the tire-pressure display may be blank/dashes, but the light should not continuously blink. [2, 5]

Pressure reference: Low-pressure warning threshold is approximately 75% of the pressure established at initialization, not necessarily 75% of the tire placard specification. Never initialize at an incorrect tire pressure. [2]

Sensor service: Replace the grommet and valve core when reinstalling sensors. Use correct valve caps. Tire sealant, depleted sensor batteries, RF interference and some aftermarket wheels can cause faults. [1, 3]

Source notes and scope

[1] Toyota NCF NM100000001FDHE, Transmitter. [2] Toyota NCF NM100000001FDHD, Tire Pressure Warning Control. [3] Toyota NCF NM100000001FDHC, General. [4] Toyota RAV4/RAV4 HV Repair Manual RM100000001ZR XV, Registration (2022-2025). [5] Toyota 2024 RAV4 Hybrid Owner's Manual, Tires and Tire Pressure Warning System.

Source scope: 2019-generation RAV4 / RAV4 HV NCF and model-specific 2024 instructions. These processes may be representative of other newer Toyota TPMS displays, but are not guaranteed to apply identically. Confirm procedures by model/year/VIN. XtraSeal ID reading and Autel utility compatibility must be verified at the vehicle.