EXTERNAL TPMS SENSOR BATTERY REPLACEMENT

Drov Part number:400112

Battery Part number:400438

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1. Scope

This document defines the procedure for replacing the battery in AVE TPMS external tire pressure monitoring sensors. It covers the battery specification, required tools, step-by-step replacement instructions, post-replacement verification, and safety considerations.

2. Battery Specification

2.1 Required Replacement Battery

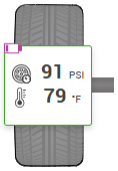
Parameter	Specification
Battery Type	3V Coin-type Lithium Manganese Dioxide (Li-MnO2)
Model	CR1632X
Manufacturer	Makumi (Shenzhen Makumi Energy Technology Co., Ltd.)
Nominal Voltage	3.0 V
Nominal Capacity	110 mAh
Diameter (D1)	16.0 mm (-0.15 mm tolerance)
Height (H1)	3.2 mm (-0.2 mm tolerance)
Weight	1.6 g (±0.1 g)
Open-Circuit Voltage	≥ 3.20 V
Instantaneous Short-Circuit Current	≥ 150 mA
Operating Temperature	-40°C to 85°C
Recommended Storage Temperature	20°C to 30°C
Self-Discharge Rate	≤ 3% per year
Shell Material	Stainless steel
Certifications	UL (MH60145), UN38.3, EU RoHS (SGS tested)

2.2 Battery Chemistry

Component	Material
Anode	Manganese Dioxide Powder, Colloid Graphite Powder
Cathode	Lithium slice
Electrolyte	Ethylene Glycol Dimethyl Ether, Propylene Carbonate, Lithium Perchloride
Shell	Stainless steel
Separator	Fiberglass Septum, Acetylene Black

3. Pre-Replacement Checks

1. Verify the sensor wheel end that is showing the low battery. The Drov UI will have a low battery symbol on that tire.



2. Measure the old battery voltage using a multimeter if possible. A reading below 2.8 V confirms the battery requires replacement.
3. Verify the replacement battery is a CR1632x type, 3V lithium coin cell. Measure its open-circuit voltage to confirm ≥ 3.20 V before installation.
4. Inspect the replacement battery visually: it must be clean, free of corrosion, rust, or leakage.
5. Ensure the work area is clean, dry, and free of static discharge risks.
6. Remove the sensor from service and deflate the tire if necessary for safe removal of the external sensor.

4. Battery Replacement Procedure

Step 1 – Remove Sensor from Tire Valve

1. Unscrew the AVE external sensor from the tire valve stem by rotating it counterclockwise.
2. If an anti-theft lock nut is installed, remove it first using the appropriate wrench.
3. Place the sensor on a clean, dry, non-conductive work surface.

Step 2 – Open the Sensor Housing

1. Identify the seam between the upper metal cap (knurled ring) and the lower sensor body (black housing).
2. Unthread the cap from the sensor carefully

3. Take care not to damage the O-ring seal or internal PCB components.
4. Set the housing cap aside in a clean area.

Step 3 – Remove the Old Battery

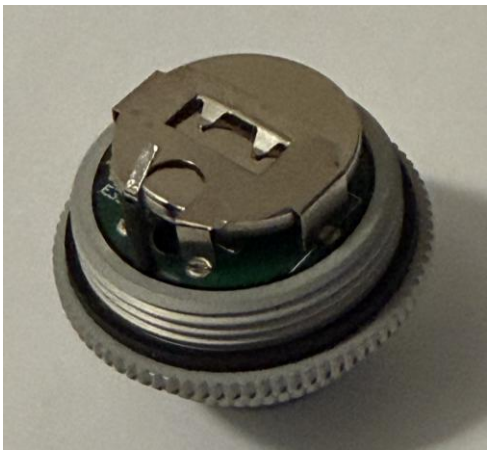
1. Locate the CR1632 coin cell battery inside the sensor housing.
2. Note the battery orientation: the positive (+) terminal faces up (flat side with marking) and the negative (-) terminal faces down toward the PCB contacts.
3. Using non-conductive tweezers, gently push the old battery out of the battery holder.
4. Set the old battery aside for proper disposal (see Section 9).

Step 4 – Inspect and Clean Contacts

1. Inspect the battery contacts and PCB for signs of corrosion, debris, or damage.
2. Inspect the O-ring seal for cracks, deformation, or contamination.
3. Allow contacts to dry completely before inserting the new battery.

Step 5 – Install the New Battery

1. Wearing nitrile gloves, remove the new CR1632X battery from its packaging.
2. Verify polarity: positive (+) side up, negative (-) side down, matching the orientation markings inside the sensor housing.

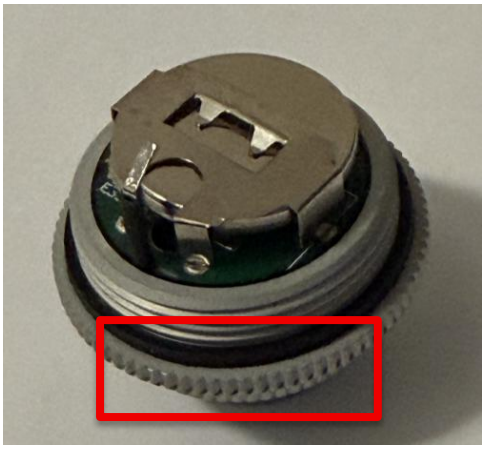


3. Gently slide the battery into the battery holder, ensuring it sits flat and makes firm contact on both terminals.

WARNING: Do NOT force the battery or use metal tools that could short-circuit the cell. Do NOT install the battery with reversed polarity.

Step 6 – Reassemble the Sensor Housing

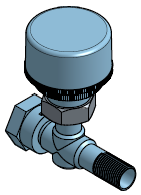
1. Ensure the O-ring seal is properly seated in its groove and it's not rolled over. Marked in picture below



2. Thread the cap back on the sensor carefully and make sure it is tightened all the way.
3. Visually inspect the assembled sensor for any gaps or misalignment.

Step 7 – Reinstall Sensor on Tire Valve

1. Thread the external sensor onto the tire valve stem or to the Tee connection
2. Install the backing nut on the valve stem or the tee connection before installing the TPMS sensor
3. Hand-tighten the sensor onto the TEE or the valve stem.
4. Tighten the backing nut again so it touches the surface of the TPMS



5. Post-Replacement Verification

7.1 Transmission Verification

1. Wait for the sensor to transmit its data packet (transmission interval is typically every 64 seconds under normal conditions).
2. Confirm that tire pressure and temperature readings are displayed on Drov web portal

7.2 Pressure Accuracy Check

1. Using a calibrated tire pressure gauge or air compressor, set the tire to a known pressure.
2. Compare the pressure reading on the TPMS display to the reference gauge.

7.4 Battery Voltage Check

If the Drov UI shows low battery voltage, confirm the new battery reads approximately 3.0 - 3.2 V.

Post-Replacement Verification Checklist

Verification Item	Acceptance Criteria	Pass / Fail
Pressure reading displayed	Pressure value shown on receiver	
Battery voltage	3.0 - 3.2 V	
Visual inspection (no leaks/gaps)	Housing sealed, no visible damage	

6. Safety Warnings and Battery Handling Precautions

6.1 General Battery Safety

- Use ONLY the specified battery type (CR1632x, 3V lithium coin cell).
- Do NOT use different battery types/brands.
- Do NOT heat, charge, crush, puncture, short-circuit, or disassemble the battery.
- Do NOT dispose of batteries in fire — risk of leakage or rupture.
- Do NOT dispose of batteries in water.
- Do NOT stack bare batteries together — risk of heat generation or explosion.
- Keep batteries out of reach of children. If swallowed, contact a physician immediately.
- Check the expiration date on the replacement battery before installation.
- Insert the battery with correct polarity. Follow the (+) and (-) markings.

6.2 Storage Conditions for Replacement Batteries

- Store in a dry, cool place at 20°C to 30°C (recommended).
- Avoid storage above 60°C or below -20°C.
- Maintain humidity below 75%.
- Keep away from strong acids, alkalis, oxides, and other corrosive materials.

6.3 Electrolyte Contact

- If skin contacts battery electrolyte, wash with water immediately.
- If electrolyte contacts eyes, flush with water and seek medical attention.

6.4 Emergency Handling

Emergency	Action
Short circuit	Disconnect the wire or conductor from the battery immediately.
Wrong polarity	Remove battery and reinstall with correct orientation (+/-).
Fire or explosion	Cover with sand or dry soil. Use dry powder extinguisher. Do NOT use water.
Irritative gas	Move to fresh air. Use a wet cloth over nose/mouth. Seek medical attention.
Battery swallowed	Contact a physician immediately.
Skin contact with electrolyte	Wash affected area with water immediately.

7. Battery Disposal

- Dispose of used lithium batteries in accordance with local, state, and national regulations.
- Do NOT dispose of batteries in household waste, natural environments (rivers, lakes, soil), or by incineration.
- Use designated battery recycling collection points where available.

Note: *This document is intended for trained service personnel. Battery replacement should be performed in a controlled environment following all safety precautions outlined above. Improper battery installation or handling may void the sensor warranty and could result in sensor malfunction or safety hazards.*