R-ORV · OFF-ROAD TEST CARRIER

R-ORV Off-Road Test Carrier

Expendable · high-mobility · built for adversarial testing and fault injection

Datasheet v1.0 · 2026-11 · Competition / research / teaching / algorithm validation

Research chassis are typically ≤10 km/h, indoor, single-vehicle and ¥75–150K per unit — assets too precious to crash. R-ORV inverts every parameter: 304×215 mm, 35 km/h track average, ≤¥30K per unit, expendable — designed for adversarial testing, fault injection and multi-vehicle scenarios.

01 Specifications

Item	Value
Footprint	304 × 215 mm
Top speed	60 km/h straight line (2026 field test; record archived)
Track average	35 km/h on unpaved track
Unit cost	≤¥30K
Configuration	High-power Ackermann 4WD off-road chassis; R-Box mount included
Edge compute	NVIDIA Jetson platform for motion-state sensing and torque distribution
Status	Prototype validated; batch consistency subject to 60-unit pilot

02 Competition compliance

Per the R-Power AI Collaborative Challenge rules V4.2, competing vehicles must meet the limits below. R-ORV is designed to these limits; the delivered configuration follows the order sheet.

Item	Rule limit / requirement
Footprint	Length ≤304 mm × width ≤215 mm (incl. all peripherals and R-Box)
Total weight	≤18 kg (incl. all onboard equipment and R-Box)
Center of gravity	≤75 mm (static, unladen)
Drive power	≤220 W continuous / ≤350 W peak (peak ≤3 s)
Battery	≤4000 mAh; ≤24 V; no parallel packs or mid-race swaps
Operating range	–20 °C to +65 °C
Protection	IP54 + shallow-water crossing (≥50 mm depth, ≥10 s)
AI compute	≤60 TOPS equivalent peak, whole vehicle

03 System composition

- Chassis: 4WD off-road platform, independent suspension, Ackermann steering, built for unpaved terrain and repeated impacts.
- Powertrain: motor, driver and battery sized to the competition limits.

- Compute: NVIDIA Jetson platform running the team's stack; R-Box mounting and cabling reserved.
- Sensing: cameras, IMU, wheel speed and RTK per configuration; interfaces aligned with R-Box.
- Safety: hardware e-stop, watchdog, low-voltage protection; manual takeover and remote e-stop supported.
- Measurement: standard R-Box mount, power and Ethernet — capture starts as soon as it is installed.

04 Typical scenarios

Scenario	What it tests
Sand / soft soil	Wheel sink, slip, traction control and passability
Slopes / consecutive curves	Attitude control, torque distribution, path tracking
Water / shallow crossing	Sealing, insulation and post-crossing function
Backlight / low light / dust	Vision degradation and perception robustness
Constrained comms	Packet loss, latency, degradation and cooperative fallback
Multi-vehicle adversarial	Formation, task hand-off, fault coverage and CRI

05 Delivery and status

Item	Description
Status	Prototype validated; 60-unit pilot in progress
In the box	Vehicle, configuration sheet, R-Box mounting kit, spares, operation and safety manual
Options	Sensor kit, spare batteries, consumables, track setup and training
Customization	Sensors, compute and chassis configured to competition rules or research topics

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