



# SENTINEL-WH

Precision pick-and-place, RFID inventory, multi-shift warehouse operations. IP67 waterproof. Dual 4-finger industrial claw grippers. 40 Ah LiFePO4 · 275 TOPS AI · WMS-integrated.

- 40 Ah LiFePO4
- 6h runtime
- 275 TOPS
- CAN FD
- ROS2
- WiFi 6E
- 48V system
- 30 kg payload
- Waterproof**
- IP67

## UNIT PRICE

# €42,000

Initial production · 95% margin on €21,539 cost

100 UNITS <b>€28,500</b>	1,000 UNITS <b>€22,500</b>
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Warehouse & Logistics Humanoid Robot

- PARTS & COST**
- ASSEMBLY
- CONNECTORS
- BRAIN & SOFTWARE
- ASSEMBLY AREA
- OPTIONAL T

## Parts, BOM & Cost

Complete bill of materials for SENTINEL-WH Warehouse Robot. All prices ex-works, single-unit quantity.

BOM Parts Total	€17,555	Initial Production Price	<b>€42,000</b>
Assembly Labor (40h×€38 + 8h×€58)	€1,984	100 units (scale)	€28,500
Testing & Calibration	€1,400	500 units (scale)	€24,800
QA + Docs + Packaging	€600	1,000 units (scale)	€22,500
<b>Total Production Cost</b>	<b>€21,539</b>	<b>Margin (initial)</b>	<b>~95%</b>

### 🌐 Labour Cost Comparison by Country (2025/2026)

Employer total cost per hour (gross salary + social contributions + overhead). Net take-home is 55-68% of gross depending on country. Romania offers 2-3x lower labour cost vs Germany for **elite-tier engineers** (+30-40% above base market rate) in industrial cities (Cluj, Timisoara, Bucharest, Brasov).

ROLE	GERMANY	FRANCE	ROMANIA	SAVING DE VS RO
<b>Assembly Technician</b>	28-38/h (3,200-4,400/mo)	26-36/h (3,000-4,200/mo)	<b>16-18/h (1,850-2,100/mo)</b>	~55% cheaper
<b>Electronics Engineer</b>	45-65/h (5,200-7,500/mo)	45-65/h (5,200-7,500/mo)	<b>22-32/h (2,550-3,700/mo)</b>	~55% cheaper
<b>QA / Testing Engineer</b>	40-58/h (4,600-6,700/mo)	38-56/h (4,400-6,500/mo)	<b>18-26/h (2,100-3,000/mo)</b>	~55% cheaper
<b>CNC Machinist</b>	32-45/h (3,700-5,200/mo)	28-38/h (3,200-4,400/mo)	<b>14-20/h (1,620-2,300/mo)</b>	~55% cheaper
<b>Production Manager</b>	55-80/h (6,300-9,200/mo)	50-72/h (5,800-8,300/mo)	<b>24-36/h (2,800-4,200/mo)</b>	~56% cheaper
<b>8-person team / month</b>	<b>~33,300</b>	<b>~29,800</b>	<b>~15,400</b>	<b>Save 17,900/mo (214,800/yr)</b>

**Romania advantage:** EU member (no import barriers), strong engineering universities (Politehnica Bucharest, UBB Cluj, UPT Timisoara). Industrial hubs: Cluj-Napoca, Timisoara (automotive), Brasov (aerospace/precision). Min. wage 2025: ~€740/month gross. **Rates shown are for elite/senior engineers** (+30-40% above base market). Social contributions: employer +26% on gross (vs ~20% Germany, ~44% France).

### Bill of Materials — SENTINEL-WH (2025/2026 Market Prices)

#	Component	Spec	Qty	Unit €	Total €	Source
1	NVIDIA Jetson AGX Orin 64GB	275 TOPS, 12-core ARM, ECC	1	€1,944	€1,944	<b>SHELF</b>
2	Intel RealSense D456	Depth+RGB+IMU, 90fps, USB-C	3	€277	€831	<b>SHELF</b>
3	Dynamixel XH540-W270-T	9.9 Nm SEA, TTL, 0.088°, IP54	12	€575	€6,900	<b>SHELF</b>
4	RPLIDAR S2	360°, 30 m, 32k pts/s	1	€203	€203	<b>SHELF</b>
5	Honeywell Voyager 1952G	1D/2D, Bluetooth, USB	1	€389	€389	<b>SHELF</b>
6	UHF RFID Module (Impinj)	860-960 MHz, 6 m range	1	€280	€280	<b>SHELF</b>
7	4-finger gripper kit (custom)	Dragon Skin 20A + servos	2	€900	€1,800	<b>CUSTOM</b>
8	LiFePO4 48V 20Ah (Dakota Lith.)	960 Wh, Grade-A, BMS	2	€694	€1,388	<b>SHELF</b>
9	CNC Al 6061-T6 frame	Machined, anodised, IP54	1	€2,400	€2,400	<b>CUSTOM</b>
10	PCBs + wiring harness	Custom carrier + harness	1	€820	€820	<b>CUSTOM</b>

#	Component	Spec	Qty	Unit €	Total €	Source
11	SENTINEL-LINK connectors ×4	18-pin circular, IP67	4	€80	€320	CUSTOM
12	Hardware, seals, Dow 732 sealant	Misc fasteners, cable glands	1	€280	€280	SHELF

**BOM Parts Subtotal: €17,555** + €1,984 labor + €1,400 testing + €600 QA = **€21,539 total production cost** · Prices: Arrow / Mouser / Robotis / SparkFun 2025