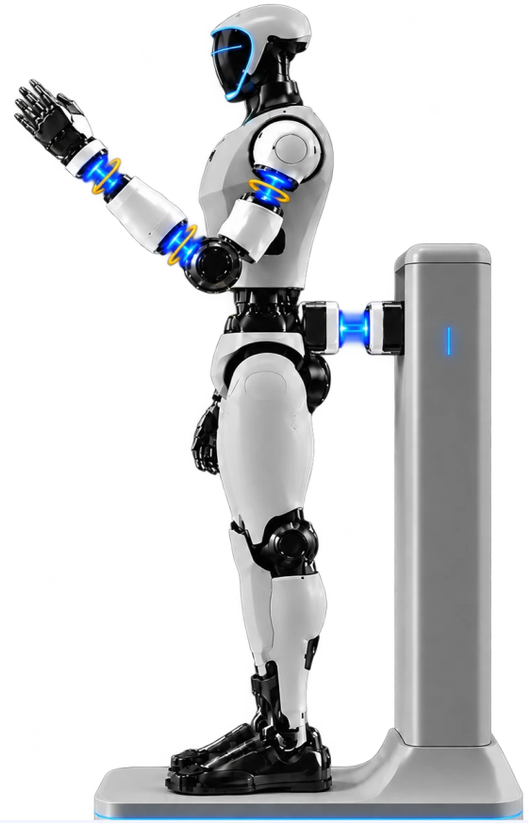
More real-world data. Longer robot life.

Contactless data at the dock and inside the joint. Two solutions that help humanoids scale.



01 Data offload while charging

02 Continuous rotary connectivity

DATA FLYWHEEL

More deployments → More real-world data
Better models → More deployments

Enabling condition: fast, reliable UC60 offload into the learning pipeline.

COST FLYWHEEL

Longer life → Lower annual cost → More deployments
Higher production volume → Lower purchase price

Enabling condition: remove cable twist with the UC60 hybrid slip ring.

Two ways to connect while charging

A dedicated robot-to-station link brings logged data to the server quickly and reliably, without depending on a shared Wi-Fi or cellular network.

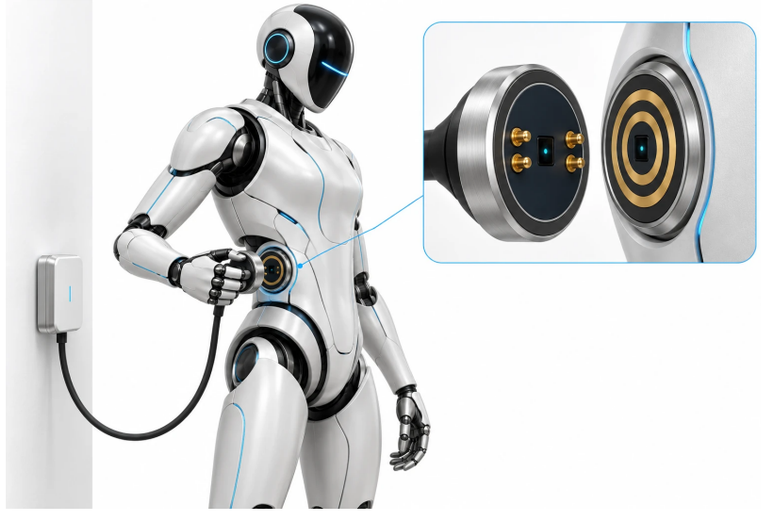


Autonomous station docking

UC60 Contactless Data Offloader

Approx. 40 × 30 mm data module
4 × 2.5GbE = 10 Gbps aggregate
Two modules = 20 Gbps aggregate

Data crosses the gap without metal data contacts. The station supplies charging power separately.



Magnetic attachment at the waist

UC60 Hybrid Port (kW + 2.5GbE)

A cable connects the port to a compact wall station.
The robot picks up the port and attaches it at the waist.

Contact-based kW power + contactless 2.5GbE data.
One attachment for charging and automatic offload.

More data, less charging time

Better cameras and tactile sensing increase logging. Faster charging reduces the time available for offload.

270 GB
logged per robot

30 min
charging window

Minimum effective bandwidth

1.2 Gbps
Data volume ÷ time

LINK / SCENARIO	OFFLOAD TIME	30-MIN WINDOW
Wi-Fi / cellular 100 Mbps effective	**360 min / 6 h**	TOO SLOW
1GbE 80% payload efficiency	**45 min**	TOO SLOW
2.5GbE 80% payload efficiency	**18 min**	COMPLETE
10 Gbps aggregate 4 parallel 2.5GbE channels	**4.5 min**	COMPLETE

Decimal GB. Wi-Fi/cellular assumes effective 100 Mbps; GbE assumes 80% payload efficiency. Aggregate transfer requires parallel channels.

Remote diagnosis: 1 avoided-service opportunity/year × USD 500 × 30% resolved remotely = USD 150/year (example).

Remove cable twist at the source

UC60 carries data without contact. Metal brushes carry power. The downstream link and actuator rotate together.



UC60 Hybrid Slip Ring

kW power + EtherCAT + other interfaces

2 shoulder + 2 elbow + 2 wrist = 6 per arm (example)

No cable twist

01 Thinner wiring

Less allowance needed for repeated torsion.

02 Smaller bore

Reduce the routing space inside the actuator.

03 Stiffer shaft

Improve bending stiffness at the same outer diameter and material.

Wiring must still meet its electrical ratings.

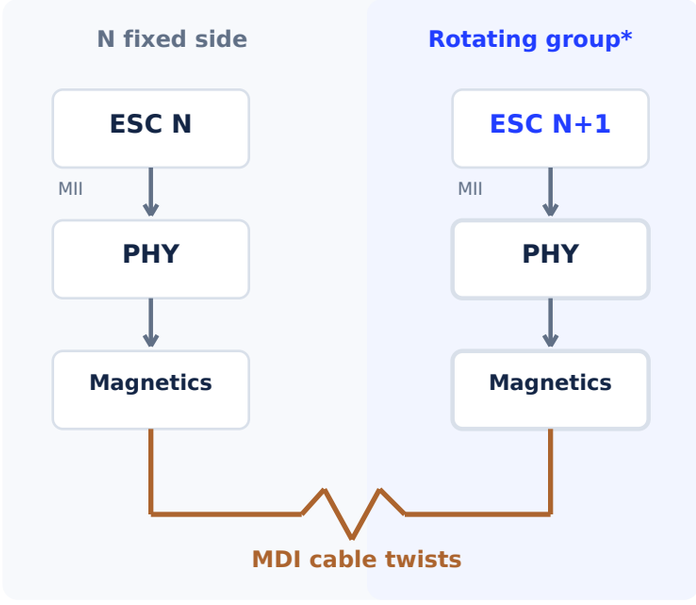
Joint motion and vibration can stress connectors and cause cable fatigue or abrasion.

Same ESC control. A different rotary data path.

Actuator N contains its fixed and rotating parts. Its output, rigid link and actuator N+1 fixed side rotate as one.

Conventional

Continuous cable

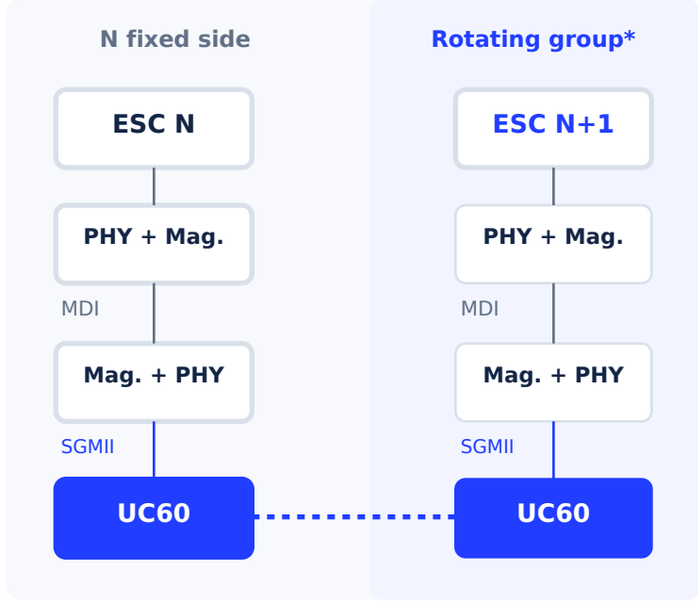


2 PHY + 2 magnetics

Twist remains at the rotation boundary.

Type A / Retrofit

Keep existing boards

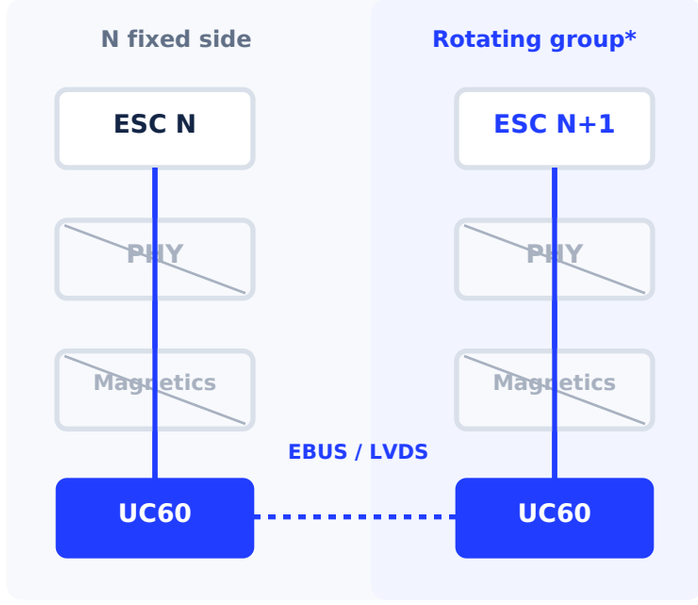


4 PHY + 4 magnetics

Copper-side adapters bridge to UC60.

Type B / Direct ESC

Fewer external components



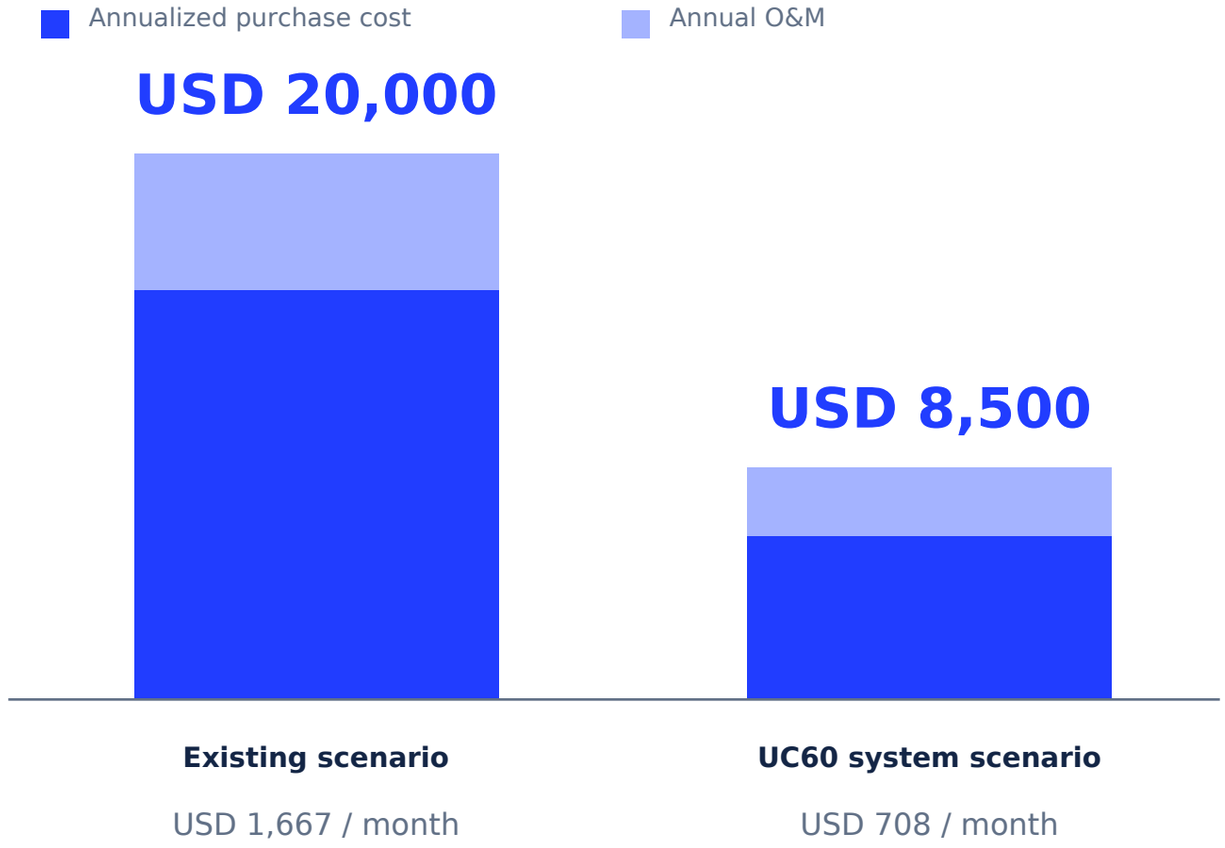
0 external PHY / magnetics

Remove these parts on the illustrated link.

*N rotor + rigid link + N+1 fixed side. Each actuator retains its own ESC. Counts cover the illustrated inter-actuator data link only.

Longer life changes the annual cost

Illustrative system scenario: USD 30,000 humanoid, service life from 2 to 5 years, annual O&M from USD 5,000 to 2,500.



57.5%

lower annual cost

USD 11,500

saved per robot / year

2.5× service-life assumption

Annual cost = purchase price ÷ service life + annual O&M

Scenario, not a guarantee. Assumes both solutions, remote diagnosis and easier service. Additional solution cost is not included. Removing a 2-year cable-twist limit only extends life if other components support the 5-year target.

Keep power on contacts. Move data off contacts.

Both approaches eliminate cable twist. UC60 also removes the sliding contacts from the high-speed data path.

Contacting data + power slip ring	UC60 hybrid slip ring
Data: ring / brush contacts	Data: UC60 contactless link
Power: ring / brush contacts	Power: ring / brush contacts

Price / cost	Shielding hardware	Size / height	Service life	Wear debris
Optimize cost and upkeep	**Simplify shielding**	**Reduce axial height**	**No data contact wear**	**Reduce wear debris**
Precision data contacts, contact materials, shielding and assembly add cost.	Control impedance and crosstalk while separating high-speed data from power noise.	Data rings, separation gaps and associated shielding occupy axial space.	Data-channel life depends on ring/brush wear and the condition of the electrical contacts.	Sliding data and power contacts can both generate wear particles.
Replace data-contact mechanics with UC60. Type B also removes external PHYs and magnetics.	Removing the data rings can simplify the shielding and separation structures around those contacts.	Replace the data-ring stack with facing UC60 modules: an opportunity to reduce axial height.	No sliding data contacts: remove data-contact wear and contact-resistance drift from the link.	No data-contact abrasion, so no wear debris from that data interface.

Benefits apply to the data interface. Power-contact wear and debris management, and RF/EMC design, remain. Price and height depend on final specifications.

Global support for humanoid integration

In-house IC, antenna, package and module development. UC60 is in volume production.



Full-duplex 60 GHz contactless IC

3.5 × 3.5 × 0.95 mm package
Native support for multiple interfaces

52
team members

4
countries

Pangyo HQ, Korea / Shenzhen, China
Tokyo, Japan / San Diego, USA

Let’s build your next humanoid together.

CHINA

Dustin Ye

General Manager, China / Shenzhen, China

WeChat: Loveyesoo

OUTSIDE CHINA

contact@uniqconn.com

Global sales enquiries

Share your interface, power and space requirements.

Uniqconn team and locations as of October 2026.