

SideCharge-150

Autonomous Robot Wireless Charging Station - Concept Specification

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Concept Product | 24 V / 5 A | 150 W Class

150 W
Continuous power

24 V / 5 A
Nominal output

Up to 90%
Target efficiency

Automatic side charging.
No exposed power contacts.
For compact AGVs, AMRs and material-handling carts.



CONCEPT SPECIFICATION

150 W	24 V / 5 A	20-29.4 V	CAN + RS-485
Continuous output	Nominal rating	Configurable voltage	Fleet communication

Concept status: target requirements for engineering development. Values are not verified production ratings.

Product Concept

SideCharge-150 is a compact side-coupled wireless charging station for light-duty AGVs, AMRs and automated carts using 24 V-class batteries. The floor-standing transmitter is positioned beside a docking lane, while a thin receiver pad is mounted on the vehicle. When the robot stops in the charging window, the system authenticates the receiver, verifies alignment and transfers power without exposed electrical contacts.

Market Need

Higher fleet availability

Opportunity charging during natural idle periods reduces long charging stops and can reduce spare-vehicle requirements.

Lower maintenance

No spring contacts, brushes or exposed charge pins to wear, corrode or collect dust.

Compact retrofit

A 150 W-class platform fits small carts that do not need a multi-kilowatt charger.

Autonomous operation

Automatic enable, charge-state feedback and fleet communication support unattended operation.

Safer factory integration

Galvanic isolation at the air gap and controlled energization reduce accessible live contact points.

Predictable docking

Side coupling uses a fixed station and vehicle-mounted pad that align naturally at a parking position.

Design positioning: a compact 24 V / 5 A charging point between low-power service-robot docks and larger 600 W-plus industrial vehicle chargers.

Target Electrical Specification

Parameter	Concept target
AC input	100-240 VAC, 50/60 Hz, single phase
Rated wireless output	150 W continuous; 180 W short-duration peak
Vehicle-side DC output	20-29.4 V programmable; 24 V / 5 A nominal
Charging mode	Programmable CC/CV profile with host-BMS enable
Supported batteries	24 V-class Li-ion and LiFePO4 packs; lead-acid profile optional
End-to-end efficiency	Up to 90% at nominal alignment; >=85% across validated charge window
Standby power	<5 W target
Isolation	2.5 kVAC target between AC input and vehicle DC output
Power factor	>=0.95 at rated load target
Electrical interfaces	Receiver DC +/-, charge enable, CAN 2.0B, RS-485 / Modbus RTU

Power Architecture

Universal AC input feeds an isolated high-frequency transmitter. A vehicle-side resonant receiver rectifies the transferred energy and regulates it through a programmable DC stage. Closed-loop communication controls current, voltage and shutdown. This architecture supports both direct battery charging and connection to a host BMS-controlled charge port.

Target Mechanical & Docking Specification



Parameter	Concept target
Station enclosure	Approx. 240 x 210 x 220 mm (W x D x H)
Transmitter coupling face	Approx. 130 x 150 x 28 mm
Vehicle receiver pad	Approx. 120 x 140 x 25 mm
Nominal air gap	20 mm
Validated air-gap window	10-35 mm target
Lateral misalignment	+/-25 mm target at full rated operation
Vertical misalignment	+/-15 mm target
Station weight	<=8 kg target
Mounting	Floor or low-wall mount; slotted anchors for alignment
Cooling	Temperature-controlled forced air; field-replaceable filter
Enclosure protection	IP54 standard; IP65 sealed option
Operating temperature	-10 to +45 C at full power; derating above 45 C

Control, Safety & Fleet Integration

Built for Reliable Autonomous Charging

A compact, contact-free charging point for 24 V robot fleets



● 24 V / 5 A Output

Configurable 20-29.4 V DC

● Docking Tolerance

Target: +/-25 mm lateral

● Industrial Protection

IP54 standard, IP65 option

● Fleet Connectivity

CAN 2.0B + RS-485 / Modbus

Target values shown - subject to engineering validation.

Function	Target behavior
Automatic charge start	Receiver detection, ID handshake, alignment check, then controlled power ramp
Charge completion	BMS command, current taper threshold or programmable timeout
Protection	Input surge, OVP, UVP, OCP, short circuit, OTP and communication timeout
Foreign-object response	Metal-object detection with inhibit or immediate shutdown
Status indicators	Power, ready, charging, complete and fault LED states
Fleet data	Voltage, current, power, temperature, accumulated energy and fault code
Remote control	Enable/disable, current limit, voltage target and fault reset over CAN or RS-485
Serviceability	Replaceable coupling pad, fan/filter module and field-upgradable firmware

Application Scenarios

Warehouse AGVs

Short charging events at loading, unloading or queue positions.

Light-duty AMRs

Automatic replenishment between missions without exposed contacts.

Material carts

Side docking beside workcells, conveyors and supermarket lanes.

Inspection robots

Unattended indoor charging in factories, utilities and technical facilities.

Service robots

Low-profile docks for cleaning, delivery and hospitality robots.

Smart test equipment

Mobile instruments that return to a station for charging and data exchange.

Development & Validation Plan

Phase	Key verification
EVT	Power stage, coil geometry, thermal limits, FOD behavior and communication
DVT	Docking tolerance map, battery profiles, EMC pre-compliance, ingress and mechanical durability
PVT	Production test limits, end-of-line calibration, burn-in and installation repeatability
Certification	Applicable safety, EMC and environmental requirements for the target sales region

Product Definition Note

All performance, dimensional and environmental values in this document are design targets created for the concept shown in the supplied images. They require electrical, thermal, mechanical, EMC and regulatory validation before release as guaranteed specifications.

Market Benchmark Rationale

The selected targets reflect the needs of compact 24 V robot fleets rather than large forklifts. Published industrial systems show that opportunity charging, automated operation, positioning tolerance, high efficiency and fleet communication are central buying requirements. SideCharge-150 intentionally targets a lower 150 W class for small AGVs and carts while retaining the industrial control and protection features expected by fleet operators.

Benchmark signal	How it influenced this concept
Wiferion industrial systems	Supports opportunity charging and reports efficiency up to 93%; concept target set to up to 90% efficiency
WiBotic robot charging	Demonstrates demand for alignment tolerance, adaptable output and fleet data; concept includes precise positioning
Conductix-Wampfler	Emphasizes intervention-free automated charging and vertical mounting; concept uses automatic side-charging
Industrial AGV market	Published offerings span hundreds of watts to kilowatts; concept occupies the compact 150 W / 24 V class

Reference Sources

Wiferion industrial wireless charging: <https://www.wiferion.com/>

WiBotic wireless charging systems: <https://www.wibotic.com/>

Conductix-Wampfler WirelessCharger: <https://www.conductix.com/>

Industrial AGV/AMR charging overview: <https://wirelesspt.com/>