



RACPRO1: AC/DC DIN RAIL POWER SUPPLY FOR MISSION-CRITICAL INDUSTRIAL AUTOMATION APPLICATIONS



The RACPRO1 series is a robust family of AC/DC DIN rail power supplies built to optimize energy efficiency, reliability, and longevity for industrial automation and renewable energy applications.

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INTRODUCTION

Today's automated assembly and production lines increasingly employ smart control systems, artificial intelligence (AI), and advanced robotics to push productivity to previously unattainable levels.

Taking advantage of these technologies demands a steady flow of power to keep operations running smoothly and reliably.

The **RACPRO1 family** of DIN rail power supplies is designed to address the unique requirements of today's advanced **industrial automation** applications, many of which operate in extreme environments. These include outdoor industrial installations such as traffic control systems, security systems, and parking garages where equipment is exposed to rain, dust, extreme temperatures, and humidity. Also included are factory environments, such as steel mills, foundries, and glass manufacturing plants with high ambient temperatures and airborne particulates, as well as food and beverage processing facilities requiring washdowns and chemical resistance for enhanced durability.

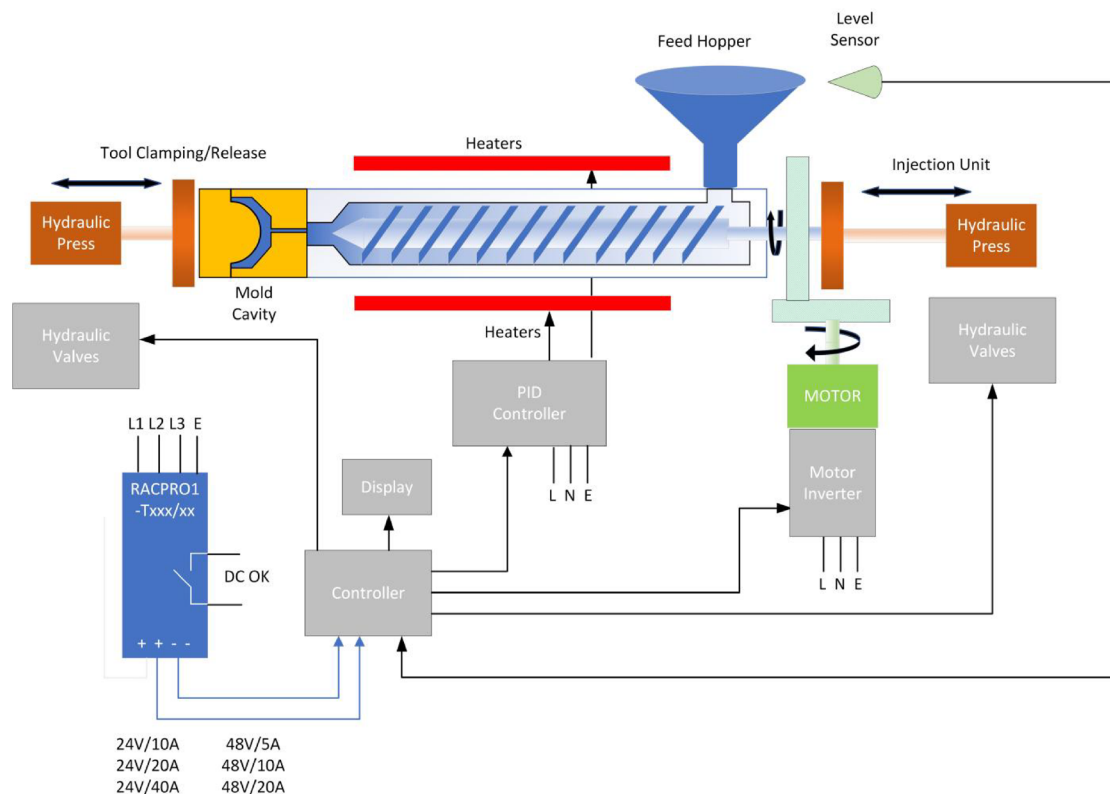


Figure 1: Injection molding - Long operational reliability, simple maintenance, and the ability to handle high ambient temperatures.

The RACPRO1-T240, -T480, and -T960 deliver 240, 480, and 960 watts, respectively. All three supplies support a universal three-phase AC input voltage range of 3 x 320VAC to 3 x 576VAC (the T240 also supports two-phase AC operation without derating, ensuring continuous operation if any one phase fails).

Furthermore, all three supplies support a universal DC input voltage range of 430VDC to 850VDC, making them ideal for DC microgrid-based factory automation applications. This broad DC input capability also supports renewable energy solutions, including biogas, photovoltaics, and wind energy applications.

Compliance and Standards

To ensure safety and compatibility across multiple industries, the RACPRO1 power supplies meet a wide array of international regulatory requirements. Certified according to the global safety standards IEC/EN/UL 62368-1, IEC/EN/UL 61010-1, and IEC/EN/UL/CSA 61010-2-201, this product line demonstrates compliance with essential benchmarks for industrial automation equipment (also information technology equipment, laboratory equipment, and control devices).

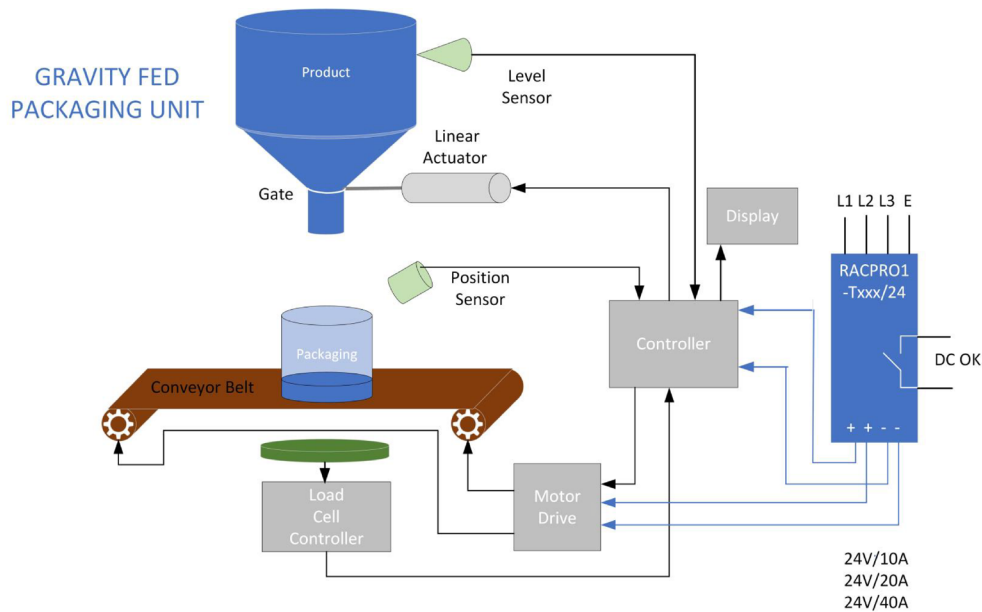


Figure 2: Packaging equipment – Long operational reliability and simple maintenance.

In addition, these power supplies adhere to stringent electromagnetic emission standards (EN 61000-6-4 Class B) and immunity standards (EN 61000-6-2), which are essential for use in heavy industrial environments. These certifications simplify regulatory compliance, enabling end users to integrate RACPRO1 into their systems without additional certification challenges. As safety standards evolve, the RACPRO1 family is designed to remain compliant, providing peace of mind to developers, integrators, and end users alike.

Performance and Reliability

The RACPRO1 series is engineered for maximum performance and reliability, addressing key metrics such as thermal behavior, [Mean Time Between Failures \(MTBF\)](#), and built-in protective features. Designed for high efficiency with minimal power loss, this series reduces heat buildup and lowers component stress, extending the lifespan to approximately 80kh at 40°C under full load.

Integrated protective features, including overvoltage protection, short-circuit protection, and thermal shutdown, enhance overall durability and ensure continued operation in harsh industrial environments. To validate long-term reliability, RECOM subjects each model to rigorous lifetime reliability testing, including extended stress simulations, shock and vibration tests, and high-temperature endurance assessments. These measures confirm the RACPRO1 series' ability to operate reliably under extreme conditions while delivering consistent and stable power.

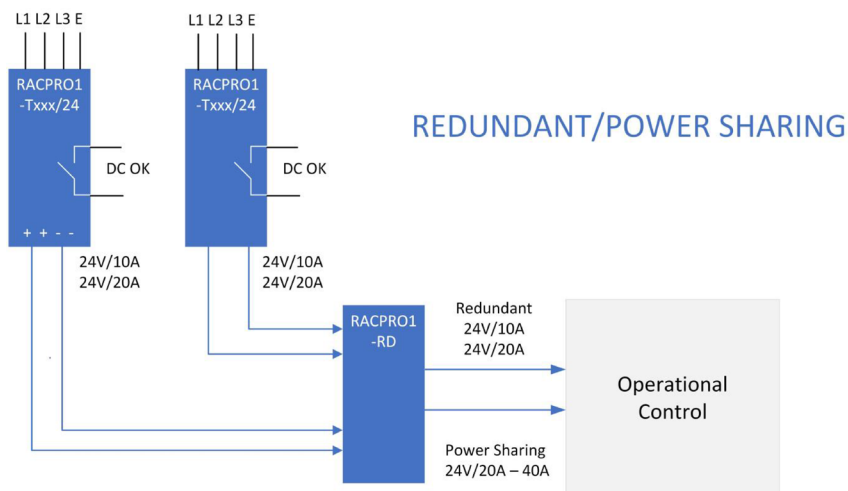


Figure 3: Operational security via redundancy and power-sharing – Reliability (single power supply failure does not affect operation) and power sharing (2X power if redundancy is not required).

The RACPRO1-T240 series supports two-phase AC input from 2x350V to 2x575V, enabling continued operation without derating in the event of a single-phase failure.

For higher reliability in mission-critical and safety-critical applications, the RACPRO1-T480 and T960 models allow parallel connection of two units. This setup enables redundancy—where one power supply continues operating if the other fails—and supports load sharing, with both supplies distributing power evenly. These features help prevent system downtime and maintain stable power in industrial automation environments and other operations where interruptions can impact productivity or safety.

Technical and Design Decisions

The RACPRO1 series reflects a meticulous approach to design, balancing ergonomics, efficiency, size, weight, and durability. Key design objectives include optimizing power conversion efficiency, extending operational lifetime, and minimizing no-load power consumption. Operating within an extended temperature range of -40°C to +70°C – with full power available up to 60°C and 120% peak power up to 45°C – the RACPRO1 series is built for demanding industrial and automation environments.

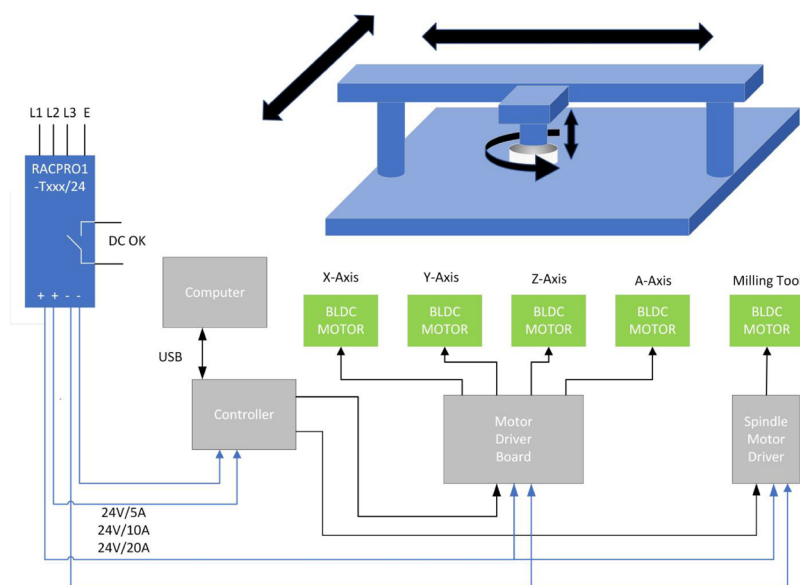


Figure 4: CNC milling – Very stable voltages under all load conditions, 150% boost for high start-up loads, and simple maintenance.

Thermal simulation and power path design are fine-tuned using advanced 3D CAD software to achieve optimal airflow and cooling. Design features include the integration of a microcontroller to control timing with precision, enhancing overall efficiency. The transformer design is also refined through CAD simulation to ensure optimal performance. While balancing high efficiency and cost, RECOM engineers use reliable commodity semiconductors combined with advanced switching topologies to meet stringent performance requirements at a competitive price point.

Competitive Edge

The RACPRO1 series stands out in the marketplace due to its real-world performance and ease of integration. In comparison with 15 competing products, the RACPRO1 series achieved best-in-class efficiency in 10 out of 15 tests and ranked among the top three in the other five.

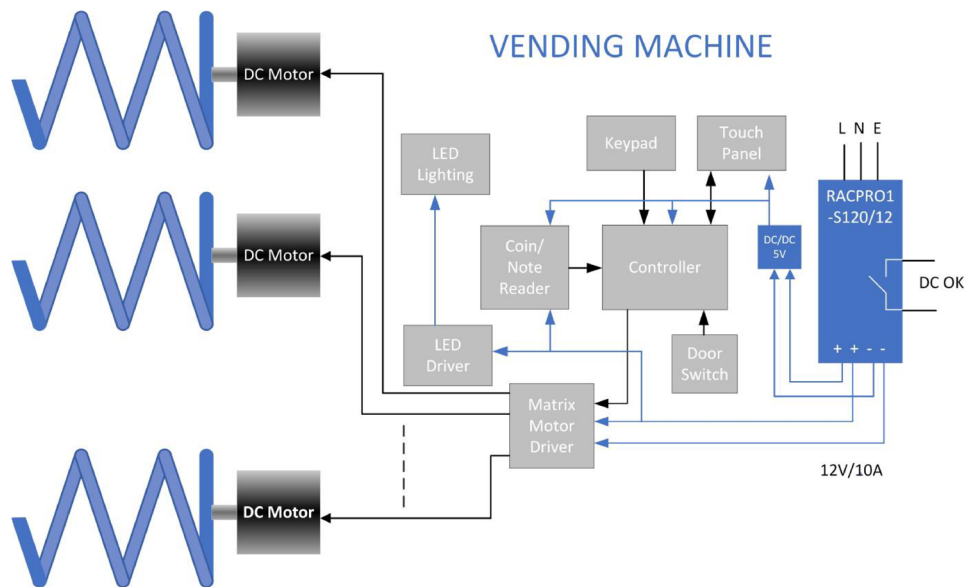


Figure 5: Vending machine – Low-cost power solution that functions efficiently in unprotected environments (cold, hot, wet, damp) and offers simple maintenance.

The RACPRO1-T960/24 and RACPRO1-T960/48 models deliver efficiencies of 96.9% and 97.1%, respectively, highlighting their strong power-saving performance. This high efficiency reduces heat generation, which in turn enhances reliability and extends component lifespan.

Their rugged construction and optional conformal coating make RACPRO1 series models suitable for extreme environmental conditions. The maintenance-free design, combined with features such as load indication and a DC OK signal, offers a dependable solution for critical applications. With a combination of advanced design, high efficiency, and straightforward handling, the RACPRO1 series consistently outperforms competitors across a wide range of industrial scenarios.

Applications and Target Audience

The RACPRO1 series is designed to cater to a wide range of industries where reliability, efficiency, and compact design are critical. Key target sectors include factory automation, process automation, machinery building (i.e., the manufacturing of machines and mechanical equipment), energy production and distribution, renewable energy systems such as wind and photovoltaic power, trackside operations in [railway infrastructure](#), and other [transportation applications](#).

BIOGAS OFF-GRID ENERGY

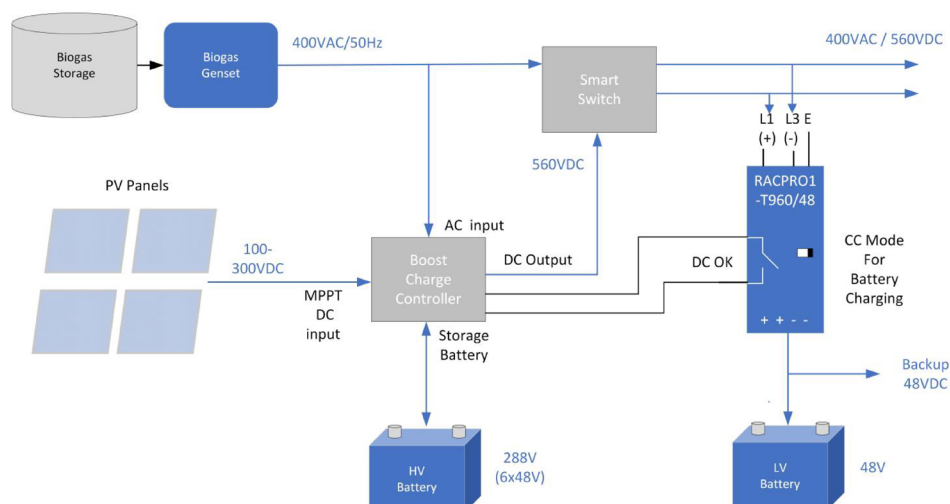


Figure 6: Biogas off-grid energy – Low-cost, simple maintenance solution supporting multiple energy sources (AC and DC).

Their exceptional efficiency and high immunity against back-feeding loads make these supplies particularly appealing for 48V drive applications, a usage scenario that has seen widespread adoption of these supplies beyond their originally intended market. Additionally, their maintenance-free design and robust construction make these supplies a reliable choice for other demanding applications, such as automated warehousing systems, mining operations, water treatment facilities, transportation systems, and oil and gas installations. By providing compatibility with remote monitoring systems via DC OK signals, the RACPRO1 series integrates seamlessly into various industrial environments, ensuring consistent performance and reliability under challenging conditions.

Longevity and Support

The RACPRO1 series is engineered for long-lasting performance, with an expected lifespan of 10 to 15 years or more. Its high efficiency – achieved through optimized thermal management – reduces power loss and heat buildup, significantly lowering component stress and extending the operational life of each unit.

WASTE WATER TREATMENT

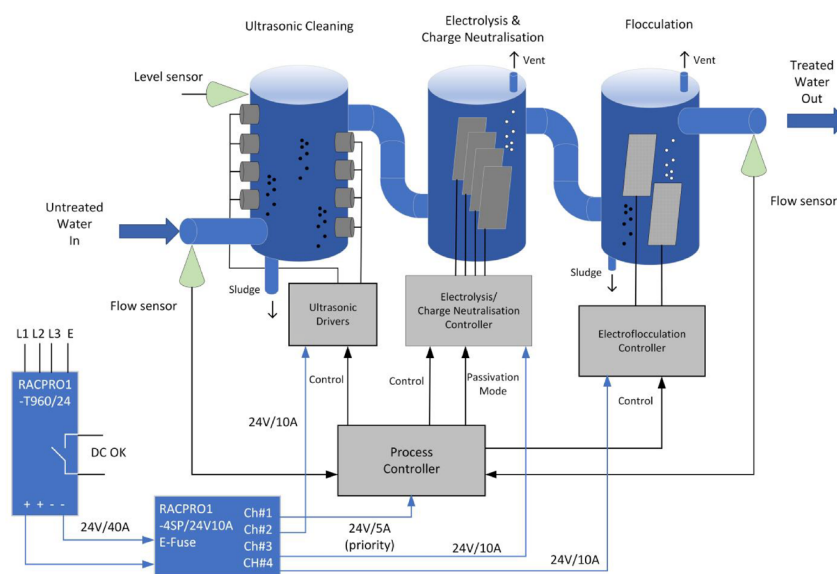


Figure 7: Waste-water treatment – Supports multiple treatment stages requiring multiple power supply channels while offering simple maintenance.

The maintenance requirements are virtually eliminated due to the robust design, especially the use of push-in connectors that require no maintenance over time. In addition, RECOM provides direct communication with its development team, enabling prompt technical support when needed. Dedicated EMC and reliability testing facilities at RECOM's headquarters are available to address specific challenges, offering a comprehensive support ecosystem that adds to the long-term value of the RACPRO1 series.

Future Development

RECOM continues to innovate, with plans to expand the RACPRO1 series to include single-phase power supplies that offer the same high-performance features as the current models. These next-generation units are scheduled for release in the third quarter of 2025.

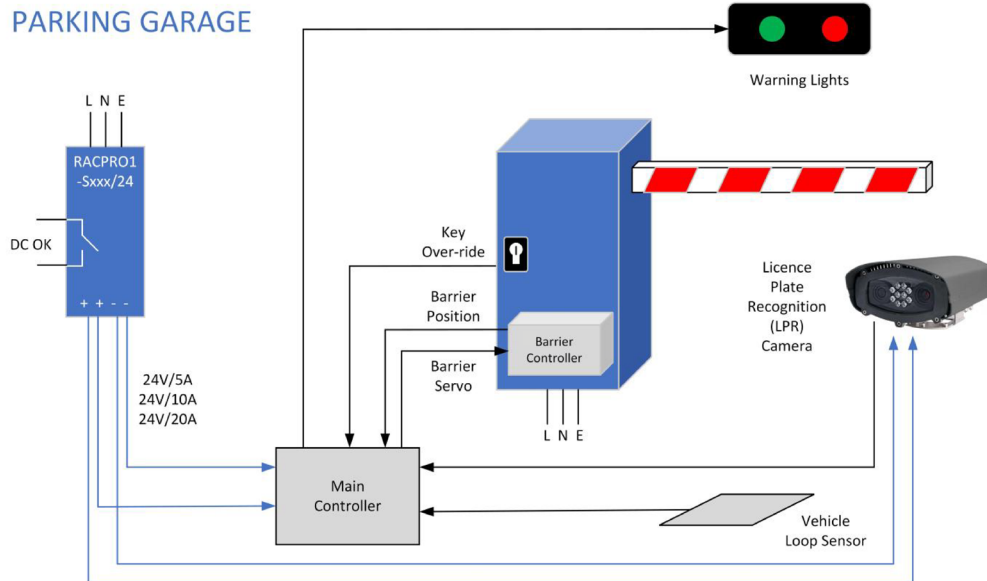


Figure 8: Parking garage – Scalable solution (from key-switch or remote control to advanced license plate recognition) designed to withstand harsh environments (cold, hot, wet, damp).

Looking ahead, RECOM plans to leverage more advanced software technologies and microcontrollers to further improve efficiency and reduce the physical size of future power supplies.

Summary

The RACPRO1 series from RECOM sets a new benchmark for industrial power supplies. Combining high efficiency, durability, and support for extreme environments, the RACPRO1 is built for demanding applications in factory automation, renewable energy, and related sectors. Designed for mission-critical systems, these power supplies deliver reliable performance to maintain continuous operation even under harsh conditions.

ACCESS CONTROL

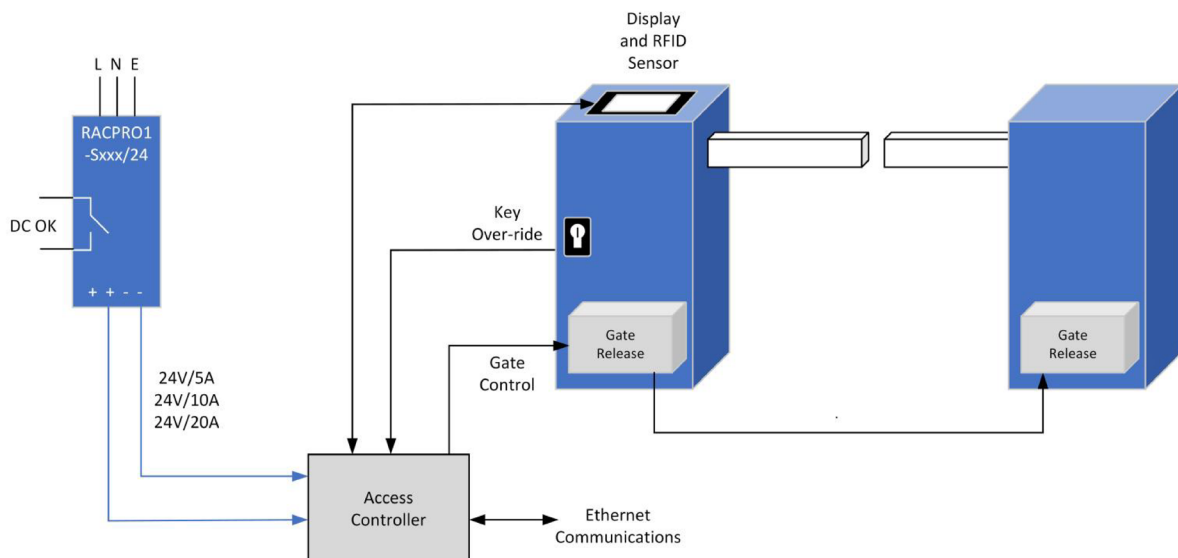


Figure 9: Access control – Simple installation, simple maintenance, reliability, and scalable support (1 to 4 gates, 5A to 20A).

As power supply technology advances, RECOM remains focused on pushing the boundaries of efficiency, reliability, and overall performance. By integrating advanced technologies into durable, market-ready solutions, the RACPRO1 series is positioned to remain a competitive choice well into the future.

Additional Resources

DIN Rail Smart Protection: RACPRO1 E-Fuse Modules

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