

Open Core Engineering

Freedom and efficiency redefined

10 TENTH ANNIVERSARY



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OPEN CORE
ENGINEERING



Meet new software engineering challenges with new opportunities

Progressively shorter product life cycles are increasing the demand for highly productive, cost-efficient machines and systems in production environments. This means new challenges for mechanical engineering. Machine manufacturers must now speed up their development work and make it even more cost-efficient. At the same time they must find ways to stand out from their competitors. All of this can only be achieved through exceptional flexibility, the shortest possible time to market and the highest degree of customer focus. Cost-efficiently developing of machine functions that will fully meet customer needs requires an all-new level of freedom and flexibility.

The development of innovative, specialized functions offering maximum customer benefit must also keep up with the concurrent entry of new IT technologies into the automation field – like smart devices and modern communication architectures. This increased use of high-level languages and device platforms is opening up new integration opportunities for enhancing production workflow automation and flexibility.

In light of this situation, Rexroth has changed the rules to bring greater benefits to machine manufacturers and end users: our Open Core Engineering combines traditional engineering approaches based on the latest IEC standards with the freedom and flexibility of modern high-level language-based applications and the latest IT technologies.

The complete package for maximum engineering efficiency

The software tools, function packages and multi-technology solutions associated with Open Core Engineering accelerate the engineering workflow. Open Core Engineering offers benefits in every step of the engineering process, from initial configuration to production operations. Detailed, time-consuming complex machine process programming can now be replaced by a simple assignment of parameters. With the aid of templates, users can flexibly integrate customized technology functions into their machine programs, augment and reuse them in a modular fashion.

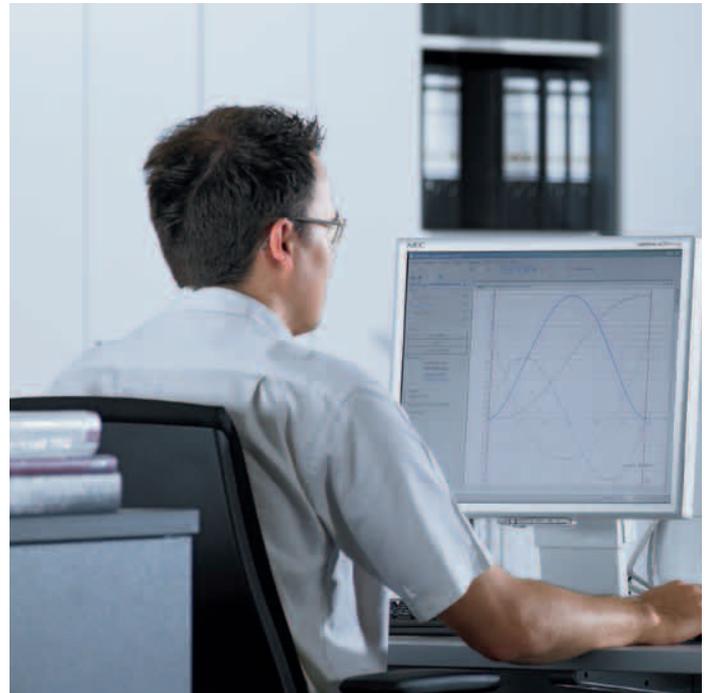
More efficient engineering for consistent software solutions

Accelerated workflows

- ▶ Comprehensive engineering framework for all automation tasks
- ▶ Engineering workflow that applies across all technologies and disciplines
- ▶ Libraries of modules with process functions that can be readily assigned parameters

Convenient configuring and programming

- ▶ Automated generation of modular machine programs
- ▶ Script-controlled machine configuration without an engineering tool
- ▶ Engineering in project teams with version-control systems



✓ Short development times with a minimum of resource usage

✓ Simplified engineering processes due to pre-programmed function packages

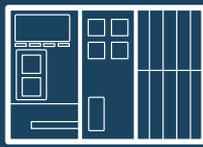
Functional flexibility for innovative machine automation

The new application options now available for smart devices together with their integration into IT infrastructures are changing the automation sector. With the Open Core Interface, users enjoy PLC programming and unparalleled flexibility with device platform selection and high-level language integration in machine projects. In addition, the interface supports Google Android and Apple iOS – the most important operating systems for smart devices. In doing so, it enables direct access to control functions with native applications.

PC



Control



Smart Devices



✓ New, innovative options for high-level language programming with free choice of device platform

Open Core Interface – new levels of freedom in engineering

High-level language programming with free choice of device platform

- ▶ C/C++, C# (.NET), Visual Basic, VBA (Office), LabVIEW G, Objective-C, Java
- ▶ Development environment: MS Visual Studio, LabVIEW, Eclipse, Xcode, Wind River Workbench
- ▶ Individual applications in realtime on the control or in non-realtime on a PC or smart device

Integration of smart devices in factory automation

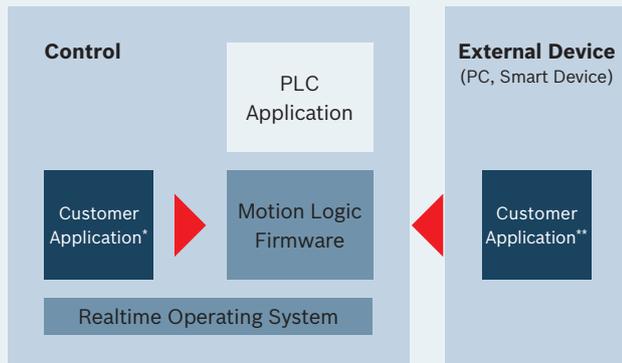
- ▶ Native IT applications run on smart devices with direct access to the control
- ▶ No need to change the machine program

Multi-server and multi-client support

- ▶ Parallel access to the control from different user applications
- ▶ Simultaneous connection to several controls

Individualization: the definitive competitive advantage

Machine manufacturers aspire to gain a competitive advantage by offering innovative functions. In the past developing such functions was only possible with the co-operation of the control manufacturer. But now, with Open Core Engineering, Rexroth is opening controls up right down to their core to enable the independent creation of customized functions supported by the existing firmware. The Open Core Interface permits the machine manufacturer to create and program realtime capable applications in C/C++ and provides it to end-users as extension of the control firmware.



* Realtime or non-realtime

** Non-realtime

▶ Open Core Interface

The Open Core Interface enables the integration of individual, realtime-capable applications directly into the control or the individual IT applications on external devices, regardless of the machine program in use.

Open Core Interface for independent development of unique functions

Individual realtime applications on the control

- ▶ Competitive advantage that stands out from the rest
- ▶ Protection of machine manufacturers' special expertise
- ▶ Can be run in parallel with the control firmware

Direct functional access right into the core of the control

- ▶ Complete access from external devices to all control and drive functions
- ▶ New methods of operation and diagnosis using smart devices
- ▶ Easy integration of simulation applications

✓ Fast and economical implementation of individual realtime control functions

✓ High-level language applications gain complete access to all control and drive functions

Future proof solutions for machine manufacturers and end-users

The choice of automation system is a critical decision for machine manufacturers – only those solutions with maximum maneuverability and flexibility can be counted on to safeguard your investments into the future. With Rexroth you have a reliable partner at your side. Open Core Engineering's consequent use of open, internationally recognized standards together with the latest technologies gives you the decision-making flexibility you need to face all future challenges.

Maximum decision-making flexibility with open standards

Consistent use of open standards and technologies

- ▶ Global availability and international acceptance
- ▶ Freedom from specific suppliers and proprietary solutions

Comprehensive, multi-technological solutions

- ▶ Transparent system interfaces
- ▶ Harmonized functions

Maximum machine availability

- ▶ sercos the automation bus – the backbone for reliable, consistent communication
- ▶ Flexible integration of different components by means of open field buses and protocols such as OPC-UA



- ✓ Reliable operation ensured by proven solutions based on open standards

sercos
the automation bus

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FOUNDATION

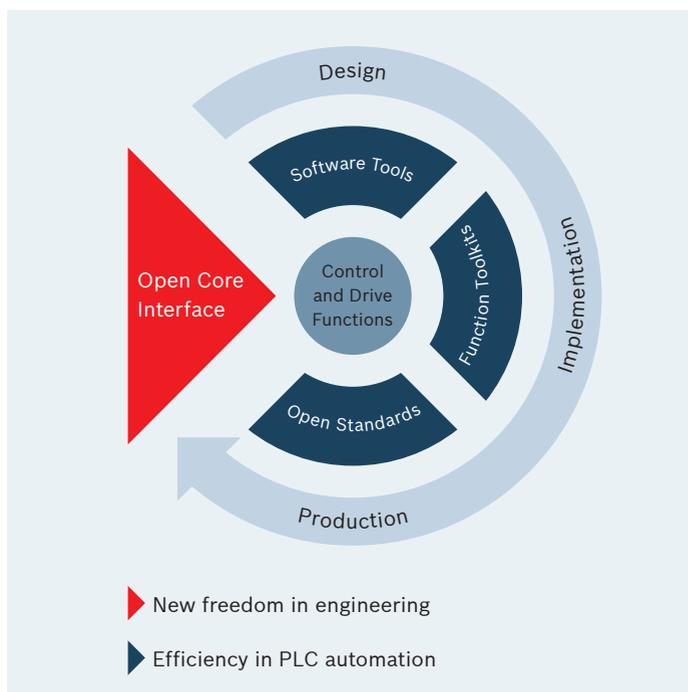


Unprecedented freedom with Open Core Engineering

Open Core Engineering combines the previously separate PLC and IT worlds into one comprehensive solution portfolio – a portfolio comprising open standards, software tools, function packages and the Open Core Interface as an enabler for new freedom. This new, integrated approach combines traditional IEC engineering with the options now made available by high-level language programming. The resulting enhanced access right into the core of the control also allows individual realtime control functions to be quickly and independently implemented.

Engineering workflows are substantially simplified thanks to a standardized engineering framework that includes advanced software tools and comprehensive function packages such as templates and intelligent technology modules. As a result, machine manufacturers and users can enjoy clear-cut benefits including lower cost, accelerated engineering and a high level of future-readiness across machine lifecycles.

With the Open Core Interface, Rexroth is providing a software interface that is unique: it permits enhanced access to the control core, offers numerous programming languages and allows the integration of smart devices into automation systems. In addition, individual realtime control functions can be independently created. These features together create an unprecedented level of freedom within software engineering.



Discover the benefits of Open Core Engineering:

- ▶ Increased efficiency in software engineering
- ▶ Unique flexibility in programming and device platform integration
- ▶ Customer-oriented, individualized machine functions
- ▶ Ongoing competitiveness thanks to future-proof open standards and technologies

◀ **Open Core Engineering combines the efficiency of PLC-based engineering with open standards, software tools and function packages to provide a new level of engineering freedom. The Open Core Interface enables enhanced access to the control core and the opportunity to configure cutting-edge machine functions.**

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