Rexroth Safety on Board
Your path to intelligent and economical machine safety
Safety technology reduces the risk of accidents. Safety on Board will also increase your productivity.

The design of modern plant and machinery is governed by safety legislation and standards. Integrated safety systems can protect employees from harm in an even more efficient way. Applied thoughtfully, they also improve ergonomics and your productivity. Comply with complex safety requirements while achieving a competitive edge at the same time.

More safety for people and systems
The requirements on machine safety are increasing across the world. New laws and standards such as the European Machinery Directive 2006/42/EC or the Brazilian regulation “Norma Reguladora 12” (NR12) already require a rethink and new approach. The globally valid ISO 13849, for example, requires a specific performance level for every safety function. Whether you are the machine user or the manufacturer – when it comes to designing new systems and if there are any significant changes, you are required to consider strict safety aspects and to demonstrate their effectiveness accordingly.

The protection of people and systems according to standards must not, however, stand in the way of increased productivity. That makes it all the more important that you do not consider your safety technology in isolation. With the right measures, you can also achieve better performance, better ergonomics, less downtime and a higher degree of flexibility. This allows you to achieve a significant improvement in the time and cost required for development and implementation. In addition, your overall development costs can be reduced while the safety level stays the same.

Safety on Board – Your path to intelligent and economical machine safety
Safety on Board by Rexroth allows the perfect combination of hardware components, software solutions and service performance. Benefit from optimized engineering for new machines as well as minimized costs for modifications to existing installations. You can also achieve more comfort, productivity and flexibility in day-to-day operation. That’s because Rexroth knows how different control system technologies interact intelligently and understands exactly what your application needs.
Challenging standards have a global effect. Are you sure that your machines are safe?

Depending on the application and the intended regional market, different safety regulations may apply to your machines and systems. In Rexroth you have a partner who understands the context.

The requirements on safety technology are increasing around the world. At the same time, they are undergoing continuous harmonization. Basic standards such as ISO 13849 for functional safety and legislation such as the European Machinery Directive 2006/42/EC are good examples. They influence the particular safety concepts in individual industry sectors and application areas – and thus the access of the machines to the different markets.

This is where Safety on Board from Rexroth offers a solution that covers all technologies. By developing an individual safety concept with standard-compliant components as well as the corresponding documentation, you can make sure that your machine withstands an inspection by the local market’s governing authorities. And it doesn’t even matter in which country your machine will be used. Rexroth applies internationally valid standards and can also support you in complying with local technical requirements.
Your safety requirements are complex. Safety on Board simplifies the implementation.

**Extensive support**
The latest safety regulations cover many aspects of your machine and system – whether electrical, hydraulic, mechanical or pneumatic, whether individual components or in combination with each other. Rexroth understands your requirements and shows you how to achieve machine safety that complies with the standards while at the same time increasing your productivity.

With Safety on Board, we have compiled an extensive range of services for you, based on our many years of experience. Take advantage of this know-how – from risk assessment and the development of safety concepts through the selection of suitable components to implementation in the machine and the training of your employees.

- **Cross-technology expertise**
  Functional safety for all drive and control technologies at all automation levels.

- **Standard-compliant products**
  Certified control systems, components, circuits.

- **Economical system solutions**
  Shorter downtimes and higher machine productivity.

- **Easy implementation**
  Efficient and integrated solutions for complex safety requirements (e.g. hydraulic press blocks, pneumatic circuits and electric drives with integrated safety functions).

- **Comprehensive service**
  Risk assessment, safety concepts, software and hardware design, commissioning, evaluation.

- **Practical training**
  Online and on site, technology-specific or broad-based.
Laws demand higher safety. Safety on Board offers you more services and more productivity as well.

Safer and more productive – the one need not necessarily exclude the other. On the contrary: by integrating intelligent safety technology, you can achieve clear advantages in day-to-day operation.

Standard-compliant protection for man and machine
If your employees work with a machine, for example during tooling changeovers, they have to be safe. But operators can only work efficiently and achieve maximum productivity if the safety technology does not slow them down. Studies show that currently 1/3 of all accidents occur after protective devices have been manipulated.

Rexroth has analyzed the work processes in different applications over many years. The specially developed Safety on Board solutions allow you to achieve perfect harmony between man and machine. You satisfy all standards and legal regulations – and your employees can focus on the relevant tasks in their day-to-day work without interference.

Precious time and cost saving
You already benefit from Safety on Board in the planning of your system. The Rexroth experts accompany you in 10 steps on the way to your required performance level. As relevant safety functions have already been integrated into the drive and control systems, you can strongly reduce the effort by the complex proof that the safety requirements have been correctly implemented. Through simulation with the SafeLogic Designer software, you shorten the verification of your application software and can commission your machine more quickly. Thanks to the high reliability of Rexroth components, you secure your investment over the complete machine life cycle.
Only those who understand the context can take full advantage of the potential. Rexroth shows you how to ensure your competitive edge by using intelligent safety technology.
Greater productivity and efficiency
Safety on Board boosts the performance of your machine. You don’t have to shut the whole system down in the event of malfunctions or when exchanging tools. All you need to do is to bring the area concerned to a safe state, temporarily and effectively. This way, you can diagnose faults quickly and rectify them immediately.
Safety on Board has been integrated into the drives in an intelligent and compact manner. This means you can quickly realize standard-compliant safety when developing new machines or retrofitting with individual components. The use of manufacturer-neutral, CiP Safety on sercos open bus system minimizes your cabling work. And the IndraWorks engineering tool simplifies the configuration of your software.

Greater flexibility and shorter reaction times
Ease of commissioning is an important factor in the design of complex machines. That’s why, intelligent software modules already simplify parameterization. The free selection of the bus systems also guarantees perfect communication between the new components and the existing ones. The number of components is reduced as the safety technology has already been integrated – saving you valuable space.

In ongoing operation, Safety on Board prevents unexpected start-up and thus dangerous movements. In the event of faults, this means it is not necessary to switch off the machine before a safe intervention by the operator is possible. The reaction time is also shortened: If limit values such as the safe speed are exceeded, the machine will react in only 2 ms, due to internal monitoring. Compared with traditional concepts, this reduces the residual paths of highly dynamic drives. As the machine reaches a safe state more quickly, you can reduce the necessary distance to the protected area.
Functional safety provides protection against hazards. With Safety on Board, you also protect your investment.

**Simplify the safe operation of machine tools**

With CNC machine tools, employees must intervene in the ongoing operation again and again – for example, if a workpiece has to be re-clamped in a milling machine. For safe operation, typical safety systems require exact compliance with several work steps.

Rexroth has simplified the process and therefore enabled a more comfortable and more efficient design. By integrating SafeLogic compact as part of the machine design, you now only need to push one button in order to prevent unexpected machine movements. The employee can work safely while the safety door is open without having to switch off the machine. This solution corresponds to the strict European Machinery Directive as well as other international standards. In addition, the compact and cost-effective system reduces the capital expenditure on safety.

**Protect your employees from moving loads**

When heavy loads are moved in the vicinity of people, it’s all about the interaction of man and machine. That’s why Rexroth considers systems as a whole and offers complete solutions across all control system technologies.

In the Russian Bolshoi Theater for example, seven stage podiums with a weight of 70 tons each are moved 16 meters up and down. The actors, musicians and stage workers must be able to work safely on and below them. That’s why the Rexroth SYB2000 stage control system controls the more than 400 hydraulic and electric drives as well as the different braking systems – and in this way achieves Safety Integrity Level 3 according to IEC 61508. Budget, time and space were limited. These challenges could only be reliably mastered thanks to Rexroth’s efficient project management.
See from concrete examples how Safety on Board allows you to achieve more safety, but also more productivity and cost-effectiveness in day-to-day operation.

**Ensure reliable energy generation**

Wind turbines are exposed to the roughest environmental conditions. Lightning strikes or overheating may cause failures in the system. If this happens, the rotor blades have to be moved out of the wind to protect workers and systems. For this purpose, most systems use electric pitch technology with three-phase motors. Every motor is controlled by an individual electronic inverter.

To satisfy the European Machinery Directive, Rexroth is the first supplier who has integrated an additional emergency controller. It is completely decoupled from the system and responds even if the power supply is interrupted. With a robust three-phase current solution, you achieve the same safety level as with a comparable, yet more expensive, DC solution. At the same time, the loads that act on the entire wind energy system in an emergency are reduced. This allows you to design your system in a more cost-effective way and to reach a higher degree of reliability.

**Enable safe working practices in the public sector**

Users of municipal vehicles must be able to trust in the reliability and safety of their machines at all times. Whether snowplows or road sweepers, in pedestrian zones or on busy roads, particularly high safety requirements are the norm.

That is why the manufacturer Hako developed and implemented the Citymaster 2000 and the Multicar TREMO driving system together with Rexroth. The innovative drive concept is based on a detailed risk assessment. It has enabled Hako to offer standard-compliant safety according to the Machinery Directive while at the same time improving functionality and increasing energy efficiency. With the new safety technology, maximum machine availability is achieved for the user thanks to Rexroth’s intelligent integration of high-quality components.
Rexroth training: by experts, for experts. So you know what it’s all about.

With the perfect combination of online training and practical training you can save time – and learn exactly the things that you need for the implementation of functional safety in your everyday work.

**Application-oriented training with innovative learning methods**

To educate your employees in standard-compliant machine safety, Rexroth offers training programs especially tailored to your requirements. Technology-specific or cross-technology learning modules provide you with the latest knowledge regarding risk assessment, evaluation, project planning or the commissioning of machine control systems. Certificates confirm that your know-how is up-to-date.

In order to utilize your time in the most efficient and effective way possible, we combine online training sessions with practical training sessions and instruction on site. This reduces travel expenses and minimizes the non-productive time of your employees. Depending on your needs, the training sessions can also take place at your location – anywhere.
Make use of our comprehensive service – from conceptual design to commissioning

More service throughout the project period
Compliance with legally binding safety regulations is a complex challenge. However, not every company can afford to employ experts with in-depth, up-to-date know-how. Smaller and mid-sized companies in particular can profit from Rexroth’s comprehensive range of services. That’s because our modular services are available not only individually, but also as a complete package. If Rexroth supports the development and implementation of your machine safety, you can be sure that all your individual requirements are reliably met.

Select individual services or the complete service package
▶ Project management
▶ System inspection
▶ Risk assessment
▶ Development of an individual safety concept
▶ Selection and perfect combination of certified hardware and software – covering all technologies and manufacturers
▶ Installation and commissioning
▶ Assessment of functional safety
▶ EC Conformity Assessment
If you want to achieve machine safety that complies with standards, you have to consider many aspects. You’re safe and sound if you supplement your know-how with Rexroth’s experience and service. In this way, you can develop and implement your safety concept with the help of the Rexroth experts.

10 steps to Performance Level

1. Risk assessment
2. Identification of the safety functions
3. Determination of the PL
4. Category selection
5. Modeling the block diagram
6. Faults and diagnosis
7. Determination of the PL
8. Evaluation of control system robustness – Failure avoidance
9. Software requirements
10. Verification and validation

Handbook for the implementation of functional safety

If you want to reduce the time and money required to design safe machine control systems, we recommend "10 Steps to Performance Level - Handbook for the implementation of functional safety according to ISO 13849." In it, we have presented the requirements of relevant standards and directives in an understandable form so that you can easily implement them in practice. You will find useful examples regarding risk assessment, safety functions, required performance levels as well as the determination of reliability values for electric, hydraulic, mechanical and pneumatic components.

Simply place your order at:
www.boschrexroth.com/safety
Benefits

- Man and machine protected
- Laws and standards satisfied
- Increased productivity, ergonomics and flexibility
- Minimized development time and effort
- Shortened reaction times and reduced space required
- Reduced Total Cost of Ownership (TCO)
Safety increases our productivity
The data specified above only serve to describe the product.
As our products are constantly being further developed, no statements concerning a certain condition or suitability for a certain application can be derived from our information. The information given does not release the user from the obligation of own judgment and verification. It must be remembered that our products are subject to a natural process of wear and aging.