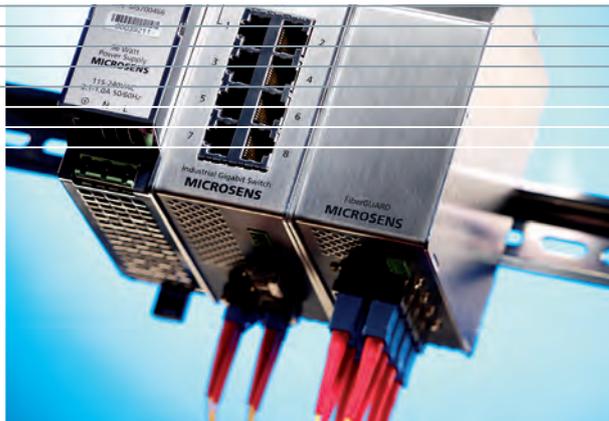


MICROSENS

FiberGUARD Resilience for fiber optic networks

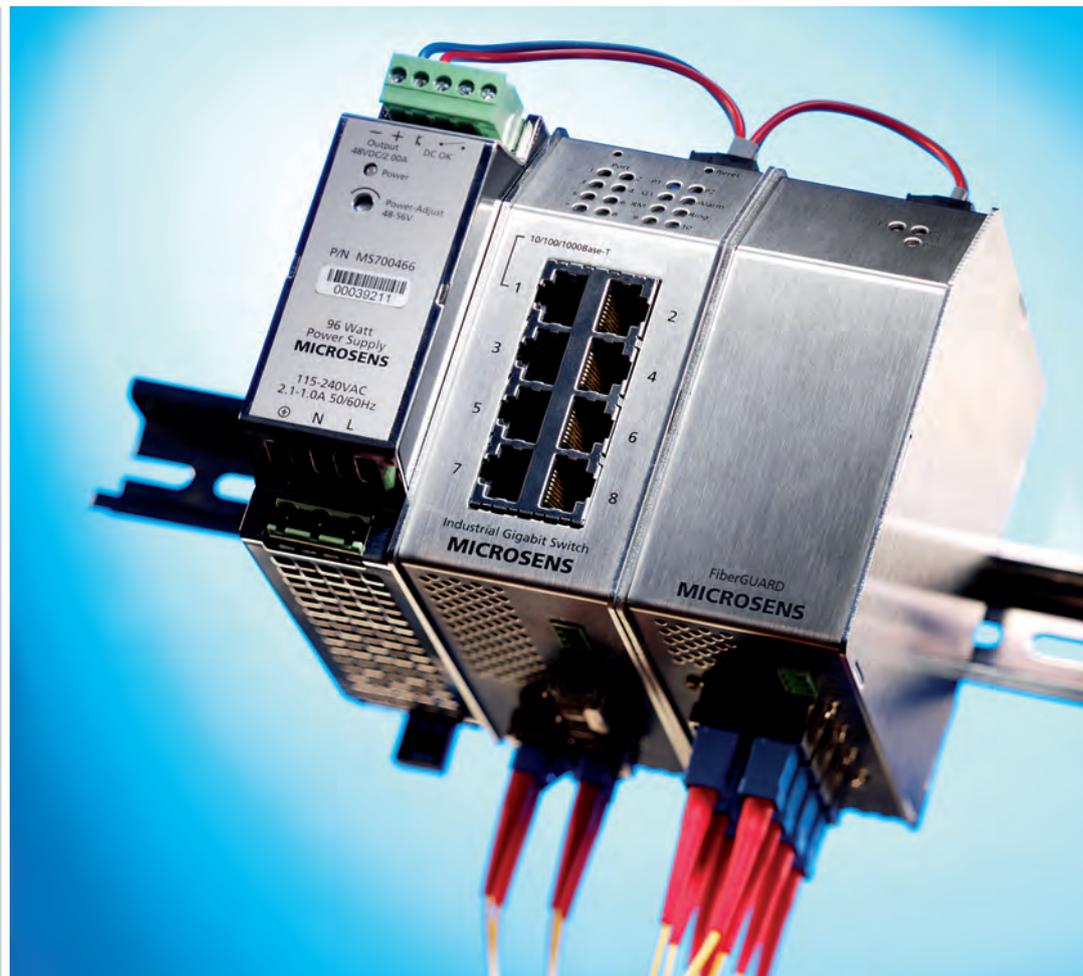


MICROSENS fiber optic solutions -
intelligent, reliable, high-performance

MICROSENS FiberGUARD

Increased reliability -
lower maintenance costs

Increases the entire
availability of critical
fiber optic infrastructures
and protects the network
integrity from loss
through blackouts or
system failures



How many single points of failure can you afford?

This question is asked more and more by those responsible for risk and change management with regard to growing conformity requirements. MICROSENS FiberGUARD supports companies in cost effectively assuring the availability of the fiber optic infrastructures used and their associated mission critical systems.

Through optical bypasses, the switch increases the tolerance of fiber optic networks regarding both single and multi point failures and limits the effects of a brownout or complete system outage.

If, for example, a failure at one network junction should occur, then MICROSENS FiberGUARD will bypass the active network components and optically maintain the communication beyond the non-operational junction.

- Adherence to compliance requirements, service level agreements (SLAs) and legal specifications
- Technical risk avoidance with the help of additional redundancies
- Cost prevention through reduction of network junctions affected by a failure
- Decrease in maintenance costs through uninterrupted maintenance and repair

More resilience for ring and bus topologies

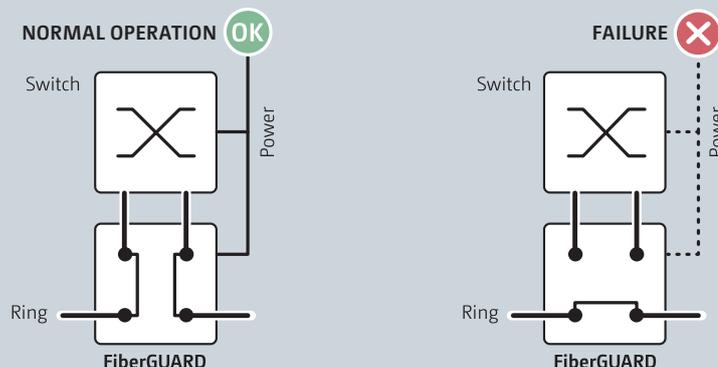
MICROSENS FiberGUARD maintains the operation of a ring topology even when more than one networking node is failing – such as during a regional blackout. However, this is not restricted to ring topologies, bus topologies can profit as well from the application of MICROSENS FiberGUARD, as with the failure of a network node communication with the network station behind is maintained.

Suitable for application under the most difficult environmental conditions

In developing MICROSENS FiberGUARD, particular focus was placed upon reducing any possible sources of error, thus the use of firmware as well as complex semiconductor technology was intentionally avoided. With its robust design, MICROSENS FiberGUARD is suitable for the toughest of environments. Typical areas of application are, for example, remote locations or locations requiring long journeys. Application scenarios can range from wind energy plants or pipeline monitoring to automated technology.

- Increased availability of ring and bus topologies through optical bypass of active components during a brownout or complete system failure
- Protocol and manufacturer agnostic through its passive optical connectivity
- Long life span, robust design, no configuration work (plug and forget), high temperature resistance
- Alarm relays for external means of alarm

MICROSENS FiberGUARD – Installation Scenario



More reliability for fiber optic ring networks

High-performance fiber optic networks in ring topologies are more often found in the industrial and energy fields, this is due to the requirement for fault tolerance in singular network nodes



MICROSENS FiberGUARD – Installation Scenario

In energy production and automated technology, the application of fiber optic rings is becoming increasingly important in order that we ensure the maximum availability of mission critical systems.

Implementing MICROSENS FiberGUARD, companies have cost effectively increased the margin of error across their fiber optic rings, beyond the single point of failure.

INDUSTRY AND AUTOMATED TECHNOLOGY



REDUCING MAINTENANCE COSTS & AVOIDING PRODUCTION DOWN TIMES

Today, modern companies in automated technology rely on redundant fiber optic rings for industrial Ethernet applications in order to avoid costly production downtimes. However, the simple redundancy of a self-healing fiber optic ring is often no longer sufficient in complex industrial applications. Here, MICROSENS FiberGUARD creates additional cost effective safeguarding through redundancy. In the case of a failure, MICROSENS FiberGUARD bypasses the active industrial Ethernet switch optically and thus protects the entire fiber optic ring from breaking down, even when several systems have been affected by the failure. During maintenance work, active components can therefore be replaced without affecting the whole production process since MICROSENS FiberGUARD ensures the integrity of the network during a device replacement.

ENERGY PRODUCTION AND WIND ENERGY



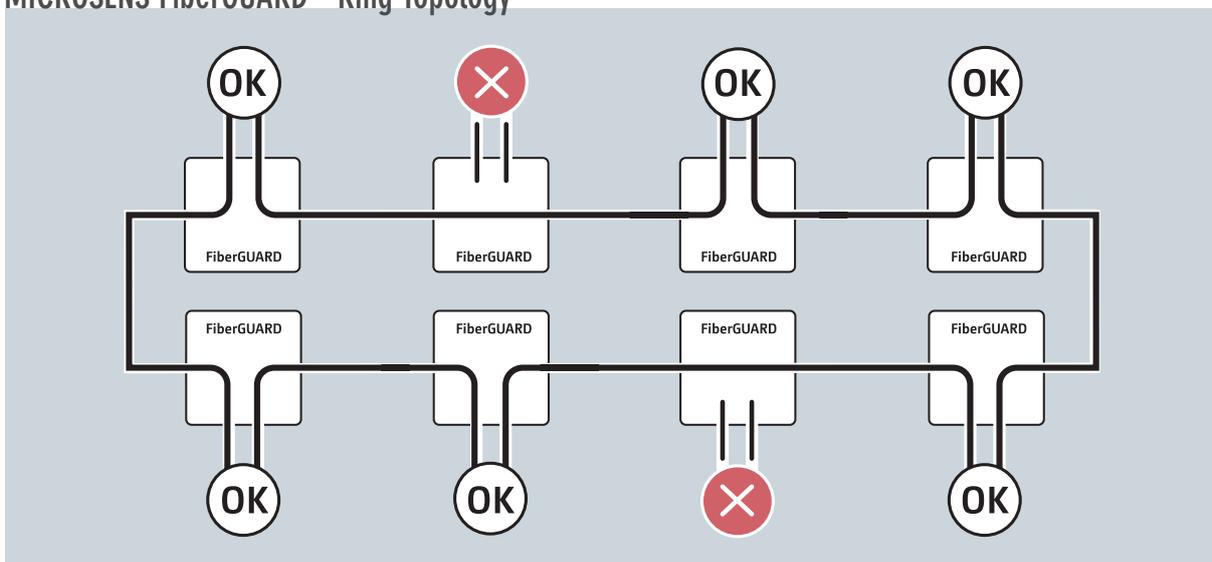
OPTIMISING MAINTENANCE PROCESSES

Energy and data networks are continually growing together. Today, wind energy plants and intelligent local network stations are connected via fiber optic rings in order that they can transmit and collate measurement and control system data.

The application of MICROSENS FiberGUARD actively supports wind energy plant operators in reducing maintenance costs and optimising maintenance and repair processes.

Before MICROSENS FiberGUARD was introduced, only single wind energy plants on a fiber optic bundle could be powered down for maintenance purposes. Now however, it is possible to conduct maintenance on several plants at the same time without the communications of the entire fiber optic ring breaking down.

MICROSENS FiberGUARD - Ring Topology



Additional redundancy for bus topologies

Due to the distances achievable with fiber optic cabling, its availability is now more commonplace where the monitoring of measuring data is transmitted more reliably over longer distances, for example when connecting signal and traffic information systems along motorways or railway lines.



MICROSENS FiberGUARD

Contrary to fiber optic networks within ring topologies, bus topologies offer no additional resilience.

If a single network component is affected by a failure or brownout, then communication with the network components behind the failed component is no longer possible. This can quickly lead to entire regions being affected by data transmission failures, even though only one network component has failed. MICROSENS FiberGUARD increases the reliability of fiber optic cabling through optical bypass, allowing communication beyond the network junction affected by the blackout to continue as normal.

TRAFFIC ENGINEERING, TUNNEL AND RAILWAY



MORE RELIABILITY FOR TRAFFIC MANAGEMENT SYSTEMS

The reliability in fiber optic networks is of vital importance for the operational traffic infrastructure. Control centres monitor and manage the traffic flow as well as signal and alarm systems. Failure of these important systems is more than just an inconvenience and can lead, in extreme cases, to a risk in safety for those road users. MICROSENS FiberGUARD provides for additional safeguarding and protects the infrastructure through optical bypass. In the event of a blackout, the switch prevents other operational stations from being cut off through the interruption of the optical connection from the fiber optic network. This comes into effect particularly in difficult to reach areas, such as within traffic tunnels. For this, MICROSENS FiberGUARD provides an important window of operation for such necessary maintenance and repairs.

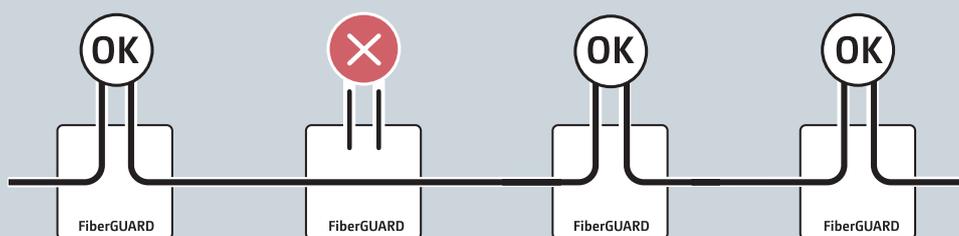
RAW MATERIALS PRODUCTION, COAL AND STRIP MINING



RELIABLE TECHNOLOGY FOR THE TOUGHEST ENVIRONMENTAL CONDITIONS

The growing automation of underground mining has led to an operational fiber optic infrastructure becoming one of the most important requirements for the application of modern mining methods today. Process information must be exchanged both over and underground. Mining and conveyor systems send important measuring and control data via IT control systems. The harsh environment puts extreme demands on the data transmission systems applied. MICROSENS FiberGUARD has been especially designed for this environment. Through intentional avoidance of failure prone firmware and sensitive semiconductor technology, MICROSENS FiberGUARD guarantees smooth operation even under the most difficult conditions. When modification work is being executed on the infrastructure, MICROSENS FiberGUARD allows a simple extension of the fiber optic cabling. By installing conveyor systems, the effects on the entire network and other mining areas will be kept to a minimum.

MICROSENS FiberGUARD - Bus Topology



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