Bulletin N° BU22000 6

Date	14.03.2022	**Classification**	
Company	**Rixen Cableway GmbH**	☐ OS ☒ O	☐ IS ☐ I
Document no.	BU220006		
Replaces	----------		
Publisher WoLu / NaAu	**Art** Plant in general	**Assembly group** Control	**Number of pages** **4**

Cableway control-unit

The heart of every cableway is the control system of the installation. In the past, the control system of the cableway primarily served to switch on and off the main-motor and to regulate the speed. Today, the control system takes over a multitude of additional safety and service/operating functions. Simplified operation and monitoring of the safety functions are the core functions of the stored-program control. For the architecture of the software and hardware, the frame conditions must first be defined.

Figure 1: Control cabinet

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Stress field safety

- Decisively reduce staff absenteeism, thus avoiding human error
- Reduce the number of error events
- Anticipate external influences (environment) (➔risk management)
- Plant and operational safety

Aspects:

- Protection of interfaces to the outside world (Internet, corporate network, mobile devices, etc.)
- Protection of the internal communication systems.
- Dynamic operational security as an overriding objective, which means that there is not just one static security solution

Expression:

- Confidentiality - data is only accessible to authorised persons
- Availability - access to systems is possible at any time after release
- Integrity and consistency - data is complete, consistent and correct, changes are traceable
- Liability - Transactions carried out can be clearly allocated and tracked

Stress field availability

- Minimise technical downtime days in operation
- Ensure > 99% availability for all systems
- Ensure worldwide service readiness (After Sales Service)
- Increase transparency of the systems - status information
- Ensuring the availability of components and replacement systems (keyword: preventive maintenance)
- Making transport capacities more flexible (keyword: energy and capacity management)

Organisation

- Service 24h 365 days
- Worldwide service availability
- Regular training
- Promotion of in-service training

Maintenance

- Diagnostic and maintenance work (on site or via remote maintenance)
- Predictive (preventive) maintenance, software update
- Recommendations and needs for further action
- Spare parts management (stocks, availability)

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New drive control

- Functional division of the control system into individual, independent and interchangeable modules
- Structure with standardised modules increases availability and simplifies maintenance
- Compact design reduces the space required in the control cabinets
- Reduction of the electromechanical switching elements
- Uniform communication via Ethernet in the system
- Third-party information such as video signals etc. can be integrated directly into the system

New visualisation and operation

- Current web technology is database-based and opens up new dimensions in the operation and monitoring of cableway control systems.
- Flexible and intuitive operation by using customised controls
- Extensive diagnostic system is available for error detection and troubleshooting. Display of additional information such as schematic extracts etc. are output directly on the screen.
- Decentralised access to cableway data via visualisation server and the network of the cable-owners company.
- Selective display of video images on the visualisation platform

New data communication

- Modular and compact design with the latest technology
- All communication participants are based on the same hardware
- Use of standardised interfaces and protocols (EtherCat)
- Higher data rate (millisecond grid)

Network topology

- Data bus system with hardware of identical nodes
- Universal IP interface
- Configuration similar to industrial IP router

Configuration and maintenance

- Web-based configuration interface
- All parameters stored on SD card
- Detailed transmission statistics

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Safety of machine controls according to the Machinery Directive

The control system of machinery and its reliability are an essential factor for the safety of the operating personnel and general safety, resulting from the risk analysis. Annex I, section 1.2.1. of the Machinery Directive addresses the requirements for safety and reliability of control systems.

Accordingly, the control systems must be planned and built in such a way that no hazardous situation arises. They must withstand the stress during operation and external influences. Errors in the control circuit logic as well as defects in the hardware or software of the control system must not cause a hazardous situation. The same applies to foreseeable operating errors.

The requirements for machinery are stated in the European Machinery Directive 2006/42/EC. Through the conformity assessment procedure, the manufacturer assures that his product meets the safety requirements set out in the guidelines. The successful conformity assessment is then documented with the EU Declaration of Conformity. Conformity with the standard is confirmed on the product itself with the CE mark. The procedure must be carried out for each product before it is placed on the market for the first time.

The Product Safety Act specifies the requirements of the EU Directive at national level. According to this, a machine is to be regarded as a new product in the event of a "substantial modification".

Is the EC Machinery Directive 2006/42/EC applicable to "switch cabinets for machinery" placed on the market separately?

In Article 1(2), the Machinery Directive excludes low-voltage switchgear and control devices from its scope if they are subject to the Low Voltage Directive (LVD). "Switch cabinets for machinery" used within the voltage limits of the NSpRL are subject to the scope of the NSpRL as low-voltage switchgear and controlgear assemblies and do not fall within the scope of the Machinery Directive.

However, if the "control cabinet for machinery" also includes the control of safety functions of the machine, this control cabinet must be classified as a safety component according to the Machinery Directive! For such a "switch cabinet for machinery", and this is a complete control system for a cableway, the distributor must comply with the requirements of the Machinery Directive and thus, for example, also issue and enclose an EC Declaration of Conformity in accordance with the Machinery Directive, as well as provide operating instructions.

A control cabinet builder becomes a manufacturer's responsibility if he not only acts "as an extended workbench" on behalf of the machine manufacturer. This means that he not only equips, wires, configures or programs the control cabinet with the components

specified by the machine manufacturer on the basis of the circuit diagram, but the control cabinet builder himself selects the components necessary for the safety functions specified by the machine manufacturer and wires, configures or programs them according to a plan he has drawn up himself.

With his activity, he himself influences the fulfilment of the safety function. He thus assumes responsibility for the correct execution of this part of the overall safety function on the machine.

Control unit exchange

When replacing control units, always use only products approved by the manufacturer! When replacing by a third-party manufacturer, the CE declaration does not automatically expire, but a new declaration of conformity (risk analysis, SISTEMA, acceptance) must be carried out and the corresponding documentation must be prepared and made available. Nonobservance so may result in the expiry of the operating licence, with considerable consequences for insurance cover!

Our service team will be happy to answer any questions or clarifications you may have.

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Please include this bulletin in the operating instructions of the system(s)!

Thank you in advance for your understanding and cooperation. The Rixen Service Team looks forward to continued good cooperation.