

4-Port Ethernet Line Breaker with integrated I/O module

ipELB is a cybersecurity system for industrial networks that can physically disconnect Ethernet connections.

Each of its relay-controlled ports can be controlled manually via a toggle switch on the device (ON/OFF) as well as remotely (REMOTE).

Software-wise, these can be controlled through a secure web interface, standardized communication protocols, or digital inputs.

- Support for 10M / 100M / 1G and 10G Ethernet
- Transparent data transmission
- Controlled bidirectional data exchange between systems
- Network segmentation
- Monitoring and switching of digital signals
- Daisy chain of multiple SEC3ER
- Conduct-through Power over Ethernet (PoE)



THE MAIN FUNCTION

The control unit for the separable Ethernet connections features three functional areas:

- The status indicators
- The mechanical control switches
- Ethernet relay ports arranged in pairs

A 3-way switch is provided for each Ethernet interface pair E1-E4 to manually control their connection state.



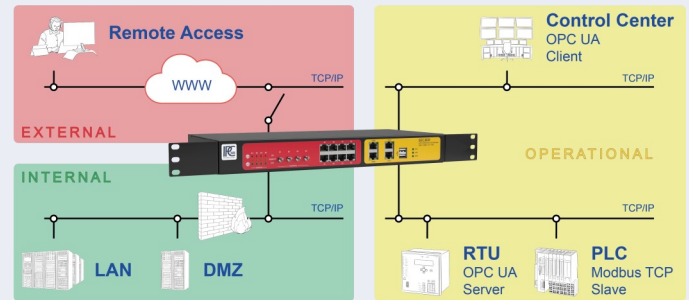
Bistable relays are used as "ON/OFF switches" for each of the eight individual lines of an Ethernet connection. These retain their current state even after a power failure or an interruption in communication. A one-to-one pin allocation is applied to connect or disconnect the partner interfaces.

THE HARDWARE

The industrial 19" controller SEC3ER is used as a hardware platform. The hardware is entirely passively cooled and does not contain any moving parts. This maintenance-free solution offers a high degree of usability, reliability, and best cost-benefit ratio.

More detailed technical data about SEC3ER with ipELB can be found at www.ipcomm.de

Secure Remote Maintenance

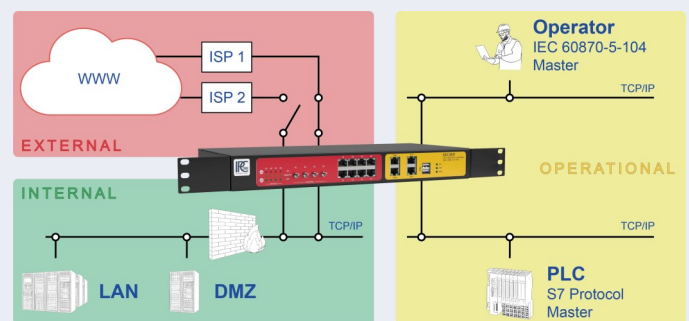


With an increasing degree of networking between machines and industrial facilities, the need for remote maintenance access to optimize costs is likewise growing. At the same time, this raises the risk of cyber attacks, especially if systems with deprecated security mechanisms or legacy systems are deployed.

With ipELB, network connectivity can be provided and monitored for secure remote maintenance. The maintenance connection can be physically disconnected, if currently not required.

Thus potential attackers have no opportunity to exploit the idle port to implant malicious code.

Redundant ISP Integration



For seamless switching between redundant Internet providers (ISP), ipELB is ideally suited.

The diagram shows the schematic structure of a corporate network. System operators can control and automate which ISP is set active.

The corporate IT can also decide which connection is utilized by using the mechanical 3-way switches. The manual switching is prioritized over automation by software.



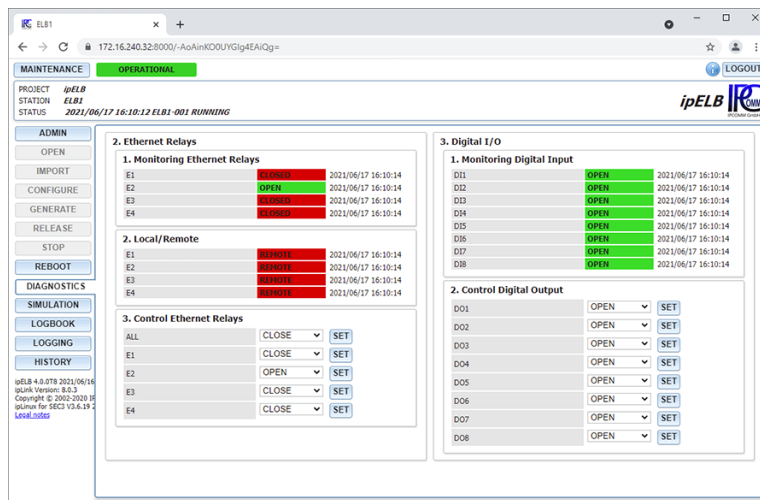
CONTROL OPTIONS FOR THE ETHERNET RELAYS

• Mechanical 3-way switches

The Ethernet relays of the interfaces E1-E4 can each be opened or closed manually via a 3-way switch.

• Web configuration interface

The status of all interfaces can be comfortably monitored and controlled in the diagnostics area of the configuration interface. Each Ethernet relay can be switched remotely using a web browser – without requiring the use of telecontrol protocols.



• Digital I/O

You can control the Ethernet relays 1:1 through the digital inputs. Even complex switching conditions can be realized by means of logical operations (AND/OR/NOT...).

Additionally, the current status of the Ethernet relays can be associated with the digital outputs, for example to control LEDs, or as a digital acknowledgement.

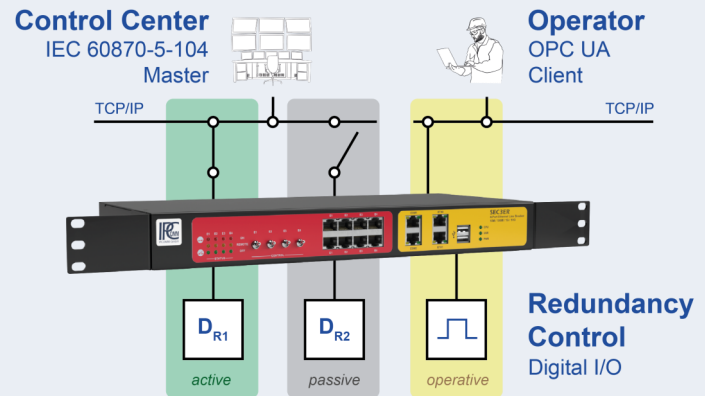
• Protocol-based automation

A multitude of standardized communication protocols are supported to automate the Ethernet relays:

- OPC UA
- OPC DAXML
- IEC 60870-5-104
- IEC 60870-5-101
- IEC 60870-5-103
- DNP3
- IEC 61850
- Modbus
- SNMP
- S7 Protocol
- REST
- MQTT
- Database Client
- Email Client

Further protocols on request!

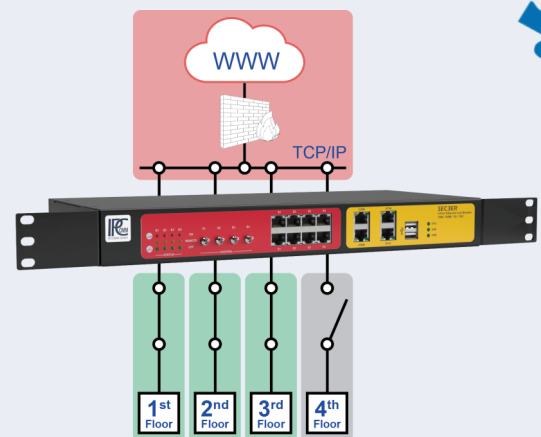
Redundancy Coupling for Standalone Systems



To ensure operation and reliability of critical systems, companies deploy redundant systems. Yet many devices do not meet this requirement. With *ipELB* even such devices can be used for redundant operation.

This is achieved by connecting two identically configured devices (e.g. by assigning the same IP address) on two Ethernet ports of the *4-Port Ethernet Line Breaker SEC3ER*. The passive component remains physically separated from the network. If the active component fails, its connection is cut while the connection to the passive device is set active.

Network Segmentation



If the physical connection status of specific network segments needs to be monitored and (remotely) controlled, we recommend the use of *ipELB*.

In case of security incidents within the corporate network, affected segments can be isolated selectively by physically separating corresponding connections. Communication on all other lines remains unaffected.

One option for controlling (and automating) the connections is the integration of intrusion detection systems (IDS). These detect anomalies in communication and can reliably disconnect affected connections using *ipELB*.