Economic Efficiency Maximum Performance Maximum Network
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n Network Availability Compact Design High Economic Efficiency

MICROSENS

MEDICAL SWITCH

with twisted pair uplink and PoE supply

Made
in
Germany

TOP FEATURES

- Security for patients and medical facilities by means of four galvanically separated 10/100/1000 Mbps accesses with integrated network isolators

- Surpasses the strict requirements according to EN 60601-1 / IEC 60601-1 (min. 4 kV) for electrical medical devices

- Fulfils the strict requirements in terms of patient protection with 2 MOPP

- Optional external medical power supply with additional protection

- Maximum network availability due to two Gigabit uplinks

- Suitable for HL7 and HIPAA applications

- Maximum performance and fault tolerance due to robust electronics proven in practical application

- Robust plastic surface allows effective cleaning and disinfection, with antibacterial coating

- High economic efficiency proven by independent surveys

- Investment protection by means of high-performance, future-proof fiber optic lines

2 MOPP

According to EN 60601-1

Insulation > 4kV

MEDICAL SWITCH

High Performance — reliable — secure

With the Medical Switch, MICROSENS is setting new standards in terms of performance, reliability, and security for data networks in medical technology, hospitals, and medical practices. The device exceeds the strict stipulations in terms of electromagnetic compatibility, as well as the requirements of the Medical Products Law. The network accesses are decoupled galvanically by means of special isolators to protect patients and devices against fault currents from the network. For particularly high demands placed on network security in the medical environment, the Medical Switch offers extensive security features, which make sure that confidential data will actually remain confidential. The Medical Switch builds on the proven, decentralised network architecture. The economic efficiency of this architecture has been established through independent surveys and numerous projects.

Data Technology for the Medical Sector

Hospitals and medical practices place particularly high demands on data technology. IT-based diagnostics and treatment systems generate huge data volumes which have to be transferred, analysed, processed, and stored. It must be possible to call up this data at any time, in cases of emergency as well as during the mobile ward round - an increasingly widespread process. State-of-the-art technology ensures reliable operation in the field of medical treatment and health care. eHealth – computer-aided healthcare – has long since become reality.

Also outside of the fields of diagnostics and treatment, the volume of the data to be transferred is increasing. The operational processes in a modern hospital have to rely on state-of-the-art data technology if the ever-increasing demands for efficiency and cost effectiveness that go with a growing level of healthcare are to be met successfully. This is valid both for the medical network and the administration with its numerous office rooms. In addition, there are the increased demands in terms of convenience and entertainment on the part of the patients, who do not want to go without WLAN, IP-TV, Internet, and telephone at the quality level they are used to.

Increased Security in the Medical Sector

Safety and patient protection are the top priorities for medical devices. The Medical Switch is intended for use in rooms used for medical purposes in accordance with IEC 60364-7-710 (VDE 0100 Part 710) for galvanic isolation of signal lines as described in section 16 of IEC/EN 60601-1. It ensures the safety of the patients and medical equipment by means of four galvanically isolated 10/100/1000 Mbps ports with integrated network isolators. Instead of four copper cables with four external network isolators, as required in conventional network concepts, the Medical Switch offers a compact, fully integrated, robust, and safe solution. In doing so, it fulfils the requirements in terms of patient protection with 2 MOPP and even exceeds the strict stipulations according to EN 60601-1 / IEC 60601-1 (min. 4 kV) for medical devices.

Hospital administrations and doctors can be certain of not only meeting the requirements of section 16 of IEC/EN 60601-1 in terms of fulfilling signal separation in the patient environment, but also complying with the strict regulations on setting up, operating, using, and maintaining medical products and their combination with other objects, such as IT networks.

High Economic Efficiency through Performance

Economically efficient solutions are in demand in order to cope with the cost pressure imposed on the health sector. Instead of costly rewiring, the existing copper data lines in hospitals and medical practices can be simply and cost-effectively expanded with the Medical Switch. Retrofitting can take place during ongoing hospital operation with minimal disruption.

A special feature is the possibility of having a power supply through Power-over-Ethernet directly from the data network. This renders the connection of a 230 VAC power supply superfluous.

The Medical Switch from MICROSENS provides two Gigabit uplink ports for top performance and network availability with redundancy, such that the enormous quantity of data generated by the IT-based diagnosis and treatment systems can be transferred quickly and securely.

The Switch offers extensive security features for the particularly stringent demands placed on network security in the medical setting just where they are needed; at the external border of the network at the terminal device connection. This ensures that data actually remains confidential.

The surface of the Medical Switch made up of robust plastic permits effective cleaning and disinfection and is optionally available with an antibacterial coating.

Isolating spacers between ports

Isolating device cover

Network isolator with 2 MOPP

MICROSENS
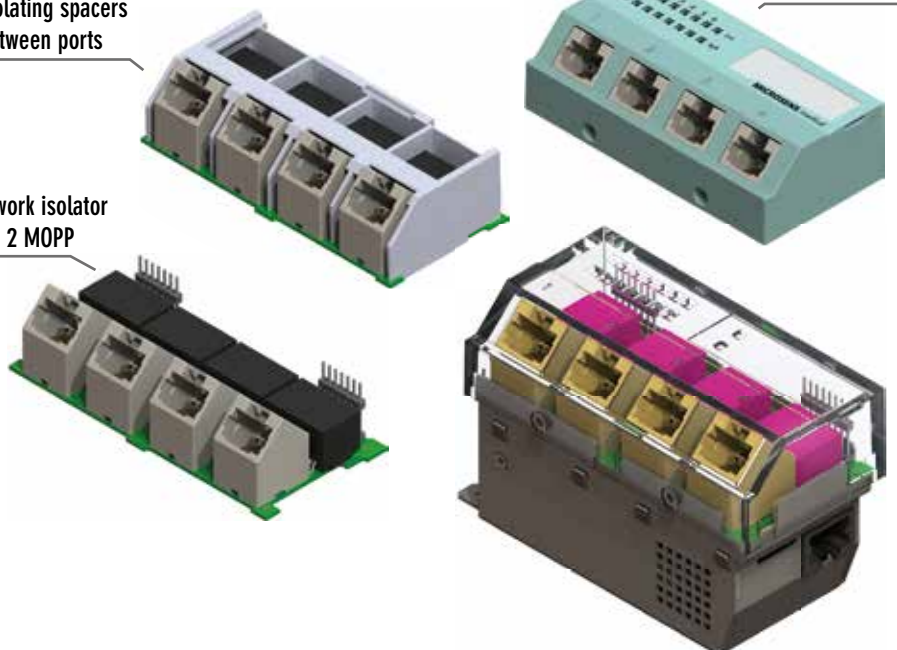
TECHNICAL FEATURES

- 4x 10/100/1000 Mbps local ports
- 1x 100/1000 SFP slots for optical fiber and an RJ-45 port for copper data lines
- Power supply optionally with 230 VAC or with DC. Optional supply from Power-over-Ethernet via the data cable (PD function).
- Four integrated network isolators for safe operation
- Minimum dielectric strength of 4 kV and 2 MOPP according to EN 60601-1 / IEC 60601-1
- Galvanic protection against accidental contact through insulating plastics for the device cover and the coating of the RJ-45 ports
- ESD resistance according to EN 61000-4-2 / IEC 61000-4-2
- Permanent function monitoring and alarming in real time via app
- Suited for applications according to Health Level 7 (HL7) and Health Information Patient Accountability Act (HIPAA)
- Comfortable administration via Web, Telnet and SNMP interface, and MICROSENS NMP software; integration of/interface to already existing network management systems over SNMP
- Extensive options for the automation via a comprehensive command line interface and an integrated script language
- Firmware and configuration on the microSD card for shortest possible recovery times
- High security level due to the application of encrypted protocols, such as SSH and HTTPS
- Port security according to IEEE 802.1X, Radius, compatible to all conventional NAC solutions
- Power supply optionally with 230 VAC, optional DC version for the connection to an existing medical power supply (in preparation)
- High energy efficiency by means of the application of state-of-the-art chip technology, Energy-Efficient Ethernet (EEE)
- Fast, tool-less installation by means of snap-in assembly
- Internationally standardised 45 mm fitting dimension
- Integrated assembly in ceiling supply units

MOPP – Means of Patient Protection

MOPP is a measure for the protection of a patient against electrical shock. This protection is achieved by means of constructive measures, such as the insulation of electrical and electronic devices. Here, one MOPP stands for a single insulation, two MOPPs for a double or enhanced insulation with a dielectric strength of 4,000 volts (4 kV). This has been defined in the international standard IEC 60601-1, which was adopted by the European Union as EN 60601-1.

MEDICAL SWITCH with twisted p

1 Gigabit copper ports (4x)
Four galvanically separated 10/100/1000 Mbps ports with integrated network isolators.

2 Gigabit uplink ports
One, optionally two Gigabit uplink ports for maximum network availability and fault tolerance, optionally with two SFP slots for purely fiber-optic-based networks or an SFP slot for optical fibers and an RJ-45 port for copper data lines.

3 Power supply connection
Power supply optionally with 230 VAC from the electrical mains, optional DC version for existing medical power supply.

4 Grounding terminal
Clamp for the connection to the earth potential.

5 Expansion port
Serial RS-232 console access for optional accessories, also configurable as RS-232 device server.

6 LED display
Open representation of all functions available across all devices: operational readiness, link status, data activity, booting process.

7 Reset and system button
Reset button for the reset of the switch or the loading of the configuration last stored (direct hardware function). System button for the selection of the IP configuration via the management or reset to the ex-factory settings.

EASY UPGRADING WITHOUT REWIRING

The modern concept of the MICROSENS decentralised network technology satisfies the increased power and security demands and yields performance, monitoring, and security where it is needed: at the external border of the network, at the terminal device connection. In place of four individual ports with four cables and four additional, external network isolators, with the Medical Switch, MICROSENS offers a compact, fully integrated robust solution with galvanic isolation and 2 MOPP. Professional, clean, and secure.

Generally, no rewiring is necessary for migration to a decentralised network with Medical Switches. In many cases the existing copper wiring can continue to be used. No new lines, no dirt, no disturbance to the clinical procedure. Medical Switches from MICROSENS are connected to the existing data lines. This way, the user can benefit from the advantages of the decentralised network concept, such as high performance, availability, and fault tolerance, while continuing to use existing infrastructure with minimal investments.

For complete restorations and new building projects, decentralised, fiber-optic based networks, as are provided for in the latest versions of the relevant cabling standards, can be a highly interesting technical and economic alternative to classical network concepts with copper wiring. They have proved their worth for years in hospitals, airports, power plants, and in security-critical applications.
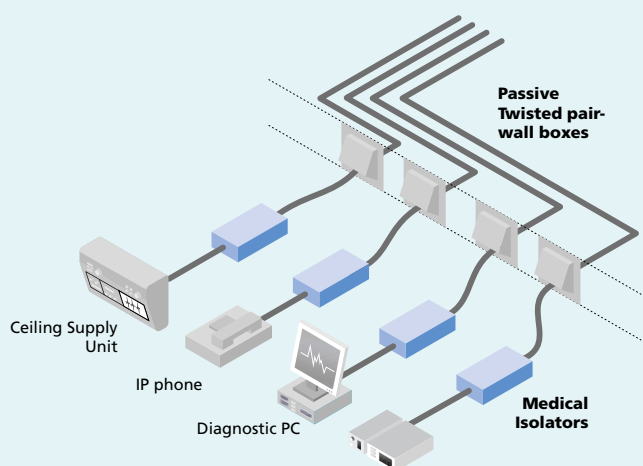
Conventional Approach
Each device is connected via dedicated twisted pair cable including the use of medical isolators.
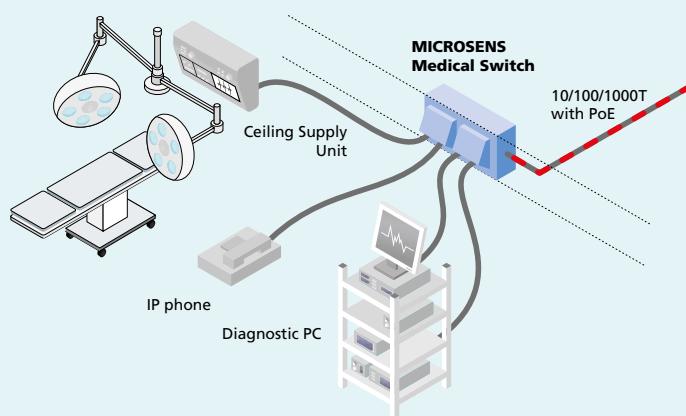
Decentral Approach with Medical Switch
Instead of passive TP-outlet a Medical Switch with integrated isolators is used. The power supply is done by PoE over the data cable.

pair uplink and PoE supply

8 Labelling field
Removable labelling field, specially integrated into the device cover and, thus, protected in case of surface cleaning.

9 microSD card slot
The firmware and configuration data are stored on the microSD card. In the case of replacement, this ensures the shortest possible recovery times

10 Gigabit downlink port
10/100/1000Bast-T port for the connection to a central network switch over copper lines or for cascading to a further Medical Micro-Switch.

MICROSENS IS KNOWN COMPETENCE ON THE SECTOR OF ACTIVE FIBER OPTIC SOLUTIONS

For 25 years, MICROSENS has been offering active fiber optic components for company networks, manufacturing plants, the industry, and access networks. Development and processing „Made in Germany" significantly contribute to product quality.

MICROSENS

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