

Wireless Adapter: Flexible space utilization
with wireless and wattless sensors

No cable,
no hassle –
"Wireless"



→ With the KL6023 Wireless Adapter and the integration of wireless and wattless switches and sensors, the Beckhoff Building Automation system has become even more intelligent.

Modern buildings require almost everything inside the outer structure to be changed or moved multiple times over the lifespan of the building. For example, partitions must be easily relocated or completely removed to meet changing occupancy demands. Furthermore, architectural designers are creating even more headaches for building engineers by using elegant glass partitions. Glass partitions divide space while creating a look of more space. It was bad enough creating flexible wiring solutions for such simple tasks as mounting switches on the standard partitions which will be moved. Now the building engineers are challenged with creating an invisible wire for mounting switches on glass walls. Well maybe no wires are needed at all thanks to using a wireless switch and the KL6023 Wireless Adapter from Beckhoff. Now the switch works on a glass wall without cable or battery, everyone is happy, and can move onto the next task.

Wattless processing

In some buildings, for example a new office building in Munich, these dreams have become reality: Radio switches without batteries were installed as part of the complete electrotechnical automation of the building. The KL6023 Wireless Adapter from Beckhoff gathers all radio signals within a radius of approximately 30 m and puts them through to the control. In addition to the simple on/off signals from the switches, the current room temperature and the set temperature are also transferred via transmitter modules with EnOcean technology. The energy consumption for the radio transmission is very low, and the required power is provided by integrated solar cells measuring approximately 1 cm², or through the action of pushing the button itself.

The technology is impressively simple. Pressing a switch causes a spring to be tensioned up to a click point. The spring operates a tiny hammer, which hits a piezo. The principle is the same as that found in lighters with electric ignition. The piezo produces a voltage that is stored by the downstream electronics and "brings it to life". The state of the switches is queried and coded within a byte. Prior to sending the information it is complemented with the address of the sender and protected against faulty transmission through encryption. Triple transmission provides additional improvement in quality. By now the energy is used up, and the electronics "goes back to sleep". When the switch is released, the process is repeated, and the bit indicating the state of the switch is reset to zero. The control therefore knows the activation duration.

Solar-operated systems also lend themselves for wireless connection to the control. The energy generated during the day is saved and provides a power reserve of more than one day. The temperature sensor reports four times per hour and in the event of a change in temperature. The energy consumption is very low, so that the device could be kept small and maintenance-free.

Watertight and dust-proof packaging

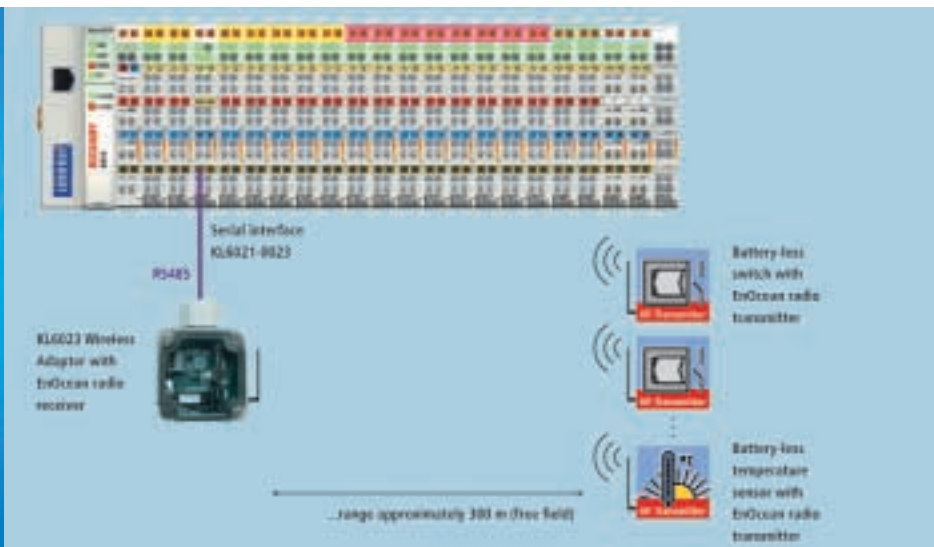
The KL6023 Wireless Adapter receives the signals of the battery-less transmitters with EnOcean technology and converts them to RS485. The receiver is installed

The KL6023 Wireless Adapter for EnOcean technology receives radio signals from the sensors and converts them to RS485. These signals are processed further directly by the serial KL6021-0023 Bus Terminal. With a radio signal range of at least 30 m, the wiring of buildings can be simplified significantly. The Wireless Adapter comes in a dustproof and waterproof IP 66 housing.

at a position with optimum reception. Pre-processing of the radio signals directly at the aerial ensures maximum transmission integrity and range. The RS485 standard digital signals, which are significantly less sensitive, are transferred to the Bus Terminal system via a cable with a length of more than 300 m. The serial KL6021-0023 Bus Terminals process the signals further and make them available to other bus systems of any type. The Bus Terminal provides the galvanically separated power supply for the Wireless Adapter. In many applications, direct linkage of the signals in a BC9000 Bus Terminal controller via Ethernet, with simultaneous connection to higher-level systems, is advantageous.

The watertight enclosures allow installation at practically any location within the building. Dust or dirt have no adverse effect. During commissioning, the status LEDs of the Wireless Adapter are visible with the lid closed. The LEDs indicate all telegrams they receive as faulty or faultless, thus supporting commissioning.

With a radio signal range of at least 30 m, the wiring of buildings can be simplified significantly. A further advantage is the fact that the fire load, particularly in areas with high occupancy, is reduced significantly. The design and rearrangement of buildings is simplified, since operator control elements are no longer restricted to walls, but can also be mounted on furniture or equipment. With a distance of more than 300 m between the Wireless Adapter and the Bus Terminal station, the receiver can be placed at any position within a building that is advantageous for radio transmission purposes. The EnOcean system does not stipulate a maximum number of transmitters per receiver unit. In practice, typically between 25 and 100 transmitters per receiver are used.



Uwe Prüßmeier, product manager for I/O systems, responds to the question: "Will wireless replace bus systems in future?"

This question can today be answered with a clear "YES and NO". Cables are sensible in all applications where sensors or actuators consume a significant amount of energy. In such applications, wired bus systems are unlikely to be displaced quickly. The situation is different in some areas of wireless digital data transfer. The energy consumption of a remote TV control, for example, is so small that a battery lasts a year or longer. In other applications the energy consumption is high, for example for a PDA or notebook, but the user accepts that the battery has to be recharged at short intervals. Wireless is therefore appropriate for these applications. Radio technology is even more appropriate, if it can operate without battery or other high-maintenance technology, making it ideal for mobile, long-lived input devices and sensors.