

Battery-Free Wireless Pushbutton Modules for Building Technologies and Industrial Automation

When planning new industrial buildings and plants, intelligent automation solutions are considered more and more, often using several decentralised control units. However, the wiring of the necessary control elements is quite quickly becoming expensive and inflexible.

Wireless pushbuttons, which do not require any cable, are the solution for this problem. They need no wiring at all and allow very flexible handling and arrangement of the switches and pushbuttons.

Conventional wireless pushbuttons, however, do have two disadvantages: They use batteries for the power supply, on the one hand, which must be changed regularly. On the other hand, the signal transmission takes relatively long (approx. 50 to 70 msec.), which may result in an overlapping of two switching operations so that one of the two signals gets lost.

One way out of this dilemma offers the innovative wireless transmission technology from EnOcean. This technology provides the required energy from the processing and ambient energy. This disposable energy is generated as kinetic energy e.g. during switching operations or vibrations, or even as thermal energy (e.g. by light irradiations or temperature differences). This procedure allows to operate the control units without cable connection and even without batteries, thus, making the units wireless, self-powered and low-maintenance.

The new wireless transmitter modules use this technology for the battery-free transmission of a pushbutton signal. In this case the required energy is produced by the switching operation itself, thus, making it independent from ambient conditions.

Transmission of the radio signal takes place on the licence-free SRD band (Short Range Devices) at 868 MHz with a transmission power of 10mW. Three very short telegrams are sent within 25 ms, including an individual 32-bit ID, the polarity of the supply voltage and the actual payload (one to two input signals). This multiple emitting guarantees utmost transmission security.

The EnOcean wireless standard at a glance :

High Reliability

- Licence-free 868 MHz frequency band with 1% duty cycle
- Multiple telegram emitting with checksum
- Ultra-short telegrams (approx. 1ms) reduce collision risk to a minimum
- Broad reach: 30m in buildings & 300m in a free field
- Repeater available for range extension
- Unidirectional and bidirectional communication

Low Energy Requirement

- High data transmission rate of 125 kbit/s
- Small data overhead
- ASK modulation

Interoperability

- Wireless protocol defined and integrated in modules

- Sensor profiles specified and implemented by users
- Unique transmission ID (32 bits)

Coexistence with other wireless systems

- No interference with DECT, WLAN, PMR systems etc.
- System design verified in industrial environment

The transmitted signals can be processed by all receiver modules that recognise the EnOcean wireless standards, provided they have been programmed for the specificity of our pushbuttons, which is already implemented e.g. in the 4-channel relay modules and the radio receiver of the WAGO-I/O system from WAGO Kontakttechnik GmbH & Co. KG. The transmission range is up to 300 m in a free field but strongly depends on the surrounding materials and the position of other energy generators or metal surfaces. Hence, certain basic conditions have to be observed for the installation planning, such as e.g. a min. distance of the receiver to other transmitters or high-frequency sources of interference. A field intensity meter allows to determine the optimal positions for sender and receiver. The wireless pushbutton module from DUX and Schlegel is available in two designs. The type DMF_A can be used as a contact element for all 2-position pushbuttons and 2-position selector or key switches. For the 3-position selector or key switches the model DMF_B is your choice. The latter transmits two input signals whereas with the DMF-Y only one input signal is sent. These modules have been designed to be combined with the attractive actuators of the design awarded control unit series DUX-Basic. The module DMF_A, however, can even be used for all suitable Schlegel ranges. The module size is approx. 43 x 45 x 29 mm. The modules are applicable at temperatures between - 40°C and + 65°C and are in accordance with the R & TTE-EU Standards for radio equipment.

We will be glad to send you more details on request.