# Energy Harvesting Technology from ZF -



# Inspiring wireless bell pushbuttons for buses

Thanks to the battery-free and wireless radio switch technology from ZF, there are various applications to increase connectivity, flexibility and convenience. One application is the integration of the energy harvesting switch in pushbuttons for stop request bells in buses. The target is to avoid labour in laying cables (up to 100 meters) and maintenance work for broken cables. The wireless switches guarantee design and maintenance freedom with a lifetime of over 1,000,000 switching cycles.

## The technological principle:

The ZF radio switch converts the kinetic energy by mechanical actuation of the switch into a voltage pulse by means of induction. This voltage pulse is enough to reliably transmit RF commands via commercially available radio protocols such as EnOcean3.0 or BLE5.0. The radio switch is therefore free of any external power sources, batteries or wires.

### The advantages:

- Flexibility in application design no cables necessary
- Long lifetime (1,000,000 switching cycles) and no batteries no maintenance necessary
- Compact design (20.1 x 7.3 x 14.3 mm) for applications with limited space
- Compatible with commercially available standard protocols (EnOcean3.0, BLE5.0, ZigBee)

#### Application example:Bell pushbutton in buses for stop request

The energy harvesting switch can be directly installed into the plastic housing of a bell pushbutton for buses. The compact design of the radio switch is beneficial for its use. By pressing the bell pushbutton, the ZF radio switch is activated mechanically and generates enough energy to send RF signals for the stop request. Each transmitter has a unique ID and can be programmed individually. This means that the bell pushbutton can be assigned to a specific command group, such as opening a door at the front, the back, or it can trigger a specific action for wheelchair passengers. The bell pushbuttons are linked to a central receiver, which is again connected to the electrical bus system. Depending on the specific command the receiver triggers visual or auditory signals to the bus driver.

Bus bell pushbutton using ZF switch



ZF Energy Harvesting Generator



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