Nowadays, the safety standards for industrial plants are tougher with respect to employee state monitoring and monitoring of working environmental conditions. Combining wireless sensor with wearable technology is possible to significantly improve safety delivery capability of such systems and add new functionality to them. Since wireless sensors use batteries as the sole energy source, the energy efficiency becomes critical. One of the solutions to reduce the energy consumption of the wireless sensor nodes is to use appropriate control for radio data transmission. In this work we have developed a wireless sensor system which can be attached to a uniform and used for working condition monitoring in places which could be prone to gas leakage. The main feature of the system is the possibility to be activated remotely by an RF control signal at a frequency of 866 MHZ. It performs various functions of wearable sensor system such as switching the system from sleep, measurement and data transmission modes when external RF signal is available and its power is greater than an appropriate level. The experimental data demonstrate that the activation distance is about 2.75 m from an RF- generator that has a power of 30 dBm. The wearable sensor system is able to signalize about employee presence in relation to working facilities, and to monitor temperature and combustible gases concentration. It consists of light-weight distributed parts attached to clothes and has low power consumption. In this work we have demonstrated a wearable wireless sensor system which can be attached to a uniform and used for monitoring combustible gas concentration and temperature. The main feature of the wireless system is the possibility to be activated remotely by an RF control signal. For that, an RF to DC conversion circuit is used. It enables switching of the sensor module from sleep or measurements modes when external RF signal is available and its power is greater than an appropriate level. The assumed RF activation distance is about 3 meters. The reliable service area of the transceiver is about 100 meters. It was shown that the connection time to wireless network takes about 1 s and data transmission - 0.3 s. The system is able to is able to signal the presence of an employee in relation to working facilities, and to monitor the temperature and the concentration of combustible gases in the environment. The function of RF remote activation of wearable wireless sensor system allows one to switch the system from the sleep to measurement mode or to turn on the transceiver module and perform data transmission after receiving the RF signal. Therefore, we can activate the wearable system in required places. This makes it possible to further reduce the wearable system power consumption in addition to the optimization of measurement algorithms.