Frequently asked questions

FAQ

Please note the following

Target group
This description is intended for the use of trained specialists in electrical installation and control and automation engineering, who are familiar with the applicable national standards.

Safety requirements
The responsible staff must ensure that the application or use of the products described satisfy all the requirements for safety, including all the relevant laws, regulations, guidelines and standards.

Liability
The documentation has been prepared with care. The products described are, however, constantly under development. For that reason the documentation is not in every case checked for consistency with performance data, standards or other characteristics, and does not represent an assurance of characteristics in the sense of § 459, Para. 2 of the German Civil Code. In the event that it contains technical or editorial errors, we retain the right to make alterations at any time and without warning.

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Principle Questions:

Q: How can I connect actuators to the wireless proximity switch system?
A: Typical actuators in factory automation are valves often in valve-islands, where 24 V are more easily available. With the WIOP wireless IO Pads then also actuators and other sensors can be integrated into a wireless installation. The WDIO input/output module allows mixed configurations of different wireless devices and also a direct wireless mapping of signals from sensors/inputs to another devices outputs.

Q: Can I connect several sensor heads to one communication module?
A: The sensor Pad WSP is a special communication module allowing the connection of up to 8 proximity switches or mechanical contacts via short wires to one wireless unit. The WSP receives its power from the magnetic field and communicates the sensor signals to the input/output module WDIO.

Q: Do I have to configure the configurable in-/outputs of the WIOPs?
A: No. The pin acts as an input as long as its output bit is not triggered. Therefore the use in e.g. the PLC determines the function it is not needed to configure. If used as an output the input bit allows readback of the signal and thus the discovery of a short circuit.

Q: Is it possible to connect a conventional inductive proximity switch to the communication module or sensor pad?
A: The wireless proximity switches consisting of the communication module and the sensor head has been developed for particularly power-saving operation on a 3 V level. Due to this, the communication modules cannot be operated with conventional proximity switches. The particular pin layout of the M12 connecting socket mechanically prevents the connection of a communication module to a conventional sensor or standard cable, also to avoid destruction of too high external voltages.

Q: Is a connecting cable between the sensor head and the communication module available?
A: The communication module has been designed for an interference-free operation also with a standard connecting cable to the sensor head (max. 3 m). Different preconfigured lengths are available together with a holding bracket for the communication module.

Q: Why is the event rate/frequency of the wireless proximity switches limited?
A: The event rate is basically mainly limited by the energy available for the transmission. The wireless devices using Wireless-POWER are designed in a way that even under worst case conditions a minimum of 5 events/second can be transmitted. Typically much more energy is available and event rates of up to 40 events per seconds are achievable in spots with more magnetic file strength.
Frequently asked questions

Wireless Communication: Wireless-COM

Q: Why is the wireless communication range only 5 m?
A: Reliability is key in the use of wireless communication in the factory floor of a production plant. The typical range of ABB’s concept may be much larger in most industrial environments (e.g. 10-15 m are typically possible), nevertheless longterm reliability/statistics of timing may then often already be significantly reduced. Another requirement for the future proof wireless technology is the possible density of wireless devices — there can be several thousand sensors/IO points also in a smaller factory. This, like with the mobile system, necessitate a cell type operation with small range devices. Only then interference between the numerous devices can be safely avoided. Sticking to the low power level which under worst case conditions gives only 5 m range allows an robust operation and practically unlimited number of wireless devices to be operated in a factory, without changing the performance (reliability and latency) or necessitating further engineering and planning.

Q: Is the delay time of wireless devices dependant on the number of addressed wireless devices?
A: No. ABB’s concept is the only system available designed for realtime operation in machines. It uses special mechanisms which guarantee the same high reliability and low latency regardess if one or three hundred wireless devices are operating in the same cell.

Q: Is it possible to use other components using the Bluetooth technology within a machine/installation containing wireless devices?
A: The new standard of communication was especially designed for industrial purposes and coexistence with all other available wireless users of the same frequency band. E.g. ABB’s concept is protected against interferences of different frequency users additionally by using a specially developed frequency hopping method (i.e. the automatic cyclic change of the communication frequency). Thus, the communication method of the wireless devices distinguishes from other systems operating in this frequency range in a way that also direct communication or any kind of mixing-up between the different systems is absolutely impossible.

Q: Is a wireless device able to communicate with different input modules (one after the other) if it is moved within a long installation (e.g. a conveyor) through the entire installation?
A: Wireless devices are normally only able to communicate reliably and without errors with the specific input module they are assigned during configuration (by sensor address and cell ID identification). No error-free communication is possible, if a wireless proximity switch is able to access more than one input/output module with its cell ID identification within its transmitting and receiving area.

**BUT:** If a minimum distance (50 m) between the input/output modules with the same cell ID can be ensured, a wireless device can be used at different places with several input modules of its cell ID identification – e.g. for tool exchange. For detailed information please refer to the Planning and Installation Guidelines in chapter „Products“ or the technical support team. Another possibility used often is to reconfigure the input/output modules by the PLC/controller in an automated way, so that they adapt to the tools Cell_Id which enables very flexible tool change scenarios.

Q: Is it possible to assign different wireless devices with the same address to one input module (e.g. for exchange tools)?
A: If it is guaranteed that always only one wireless device is located in the receiving area of the input module, it is possible to assign several devices under one address one after the other to one input module. However, this should only be used, if it can be guaranteed e.g. within the bounds of the tool-changing process that it can never happen that two devices with the same sensor address are simultaneously located within the receiving/transmitting area of the input module. For example this can also be guaranteed by laying down the tool not needed outside the area of the electromagnetic field or by using the WIOP which is switched off when 24 V are not present anymore. For detailed information please refer to the Planning and Installation Guidelines in chapter „Products“.

Q: Is an input/output module freely configurable?
A: The simplest way of assigning wireless devices to an input module is to assign the addresses one after the other as offered by the input module. However, the user can also freely choose the address of each wireless device during configuration. For detailed information please refer to the Planning and Installation Guidelines in chapter „Products“.
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Wireless Power Supply: Wireless-POWER

Q: Is it allowed to stay in the area of the Wireless-POWER electromagnetic field?
A: The electromagnetic field for the supply of wireless devices is very weak. Thus, according to the current international standards it is possible for operator personal not wearing cardiac pacemakers or other body aids to stay in such areas up to a full normal work shift every day without any known danger of interference with health. The same frequencies and principle is used in many anti-theft or RFID systems e.g. in shopping areas. For detailed information please refer to the expert's report in chapter „Certificates“ and the Planning and Installation Guidelines in chapter „Products“.

Q: Does the electromagnetic field interfere with other components of a machine/installation?
A: With a frequency of 120 kHz the electromagnetic field is operating in an allowed frequency range for such applications. Similar frequencies are produced in frequency converters and switch mode power supplies. Its wavelength is too long to cause interferences with most electric and electronic devices. However, it cannot be excluded that for example devices containing sensitive electronic or electric inductance coils can be influenced by the electromagnetic field. Following the collected experiences, interferences can be always avoided by careful observance of the earthing and installation guidelines of such devices. An exception are some old capacitive sensors which are known to be especially sensitive to electromagnetic noise. All manufacturers have new principles which avoid such interference.

Q: Is it allowed for persons wearing cardiac pacemakers or other body aids to stay in the area of the electromagnetic field?
A: Cardiac pacemakers and similar body aids may be particularly sensitive to electromagnetic fields. Persons wearing such body aids are therefore not allowed to stay within the area of the electromagnetic field and additionally should observe a safety clearance. For detailed information please refer to the expert's report in chapter „Certificates“ and the Planning and Installation Guidelines in chapter „Products“.

Q: Is it possible to enlarge the volume supplied by the electromagnetic field as desired?
A: In its simplest configuration consisting of two pairs of primary loops with one power supply each, the electromagnetic field is able to supply a volume of 3 x 3 x 3 m³. This volume can be increased to 3 x 3 x 6 m³ by installing one further primary loop and two power supplies. Larger machine/installation volumes can be supplied by the modular addition of further primary loops and power supplies. For more detailed information please refer to the technical support.

Q: Are also other primary power loop configurations possible e.g. to cover longer line type machine parts (conveyor belts) or just selected areas of a machine (problem areas)?
A: Due to the automatic control in the WPU100 power units there is a great degree of freedom in designing special power loop arrangements. If e.g. the area of supply or additionally the movement of the devices is known, often a simpler type of wireless power supply can be used, e.g. only one primary loop and one WPU100 unit.
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