

Direct Link ®

*Features and functional
specifications*

Ver.
1.3 - 30/10/2021

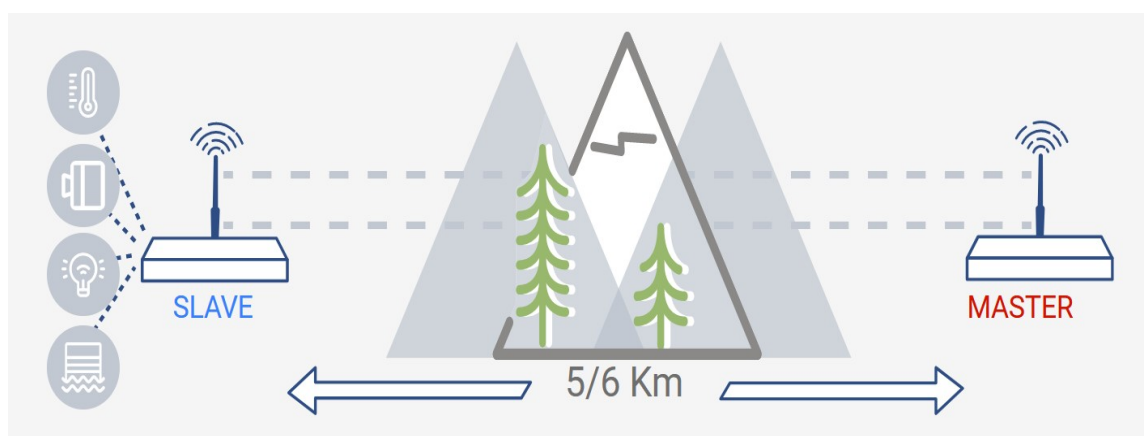
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General description

The Direct Link ® system consists of a pair of devices (**master** and **slave**), which communicate via radio waves using the free frequency of 169MHz which allows to transmit up to 5-6 km away even in the presence of mountainous reliefs, dense vegetation and adverse weather conditions. The transmission power used of just 0.25 W then allows the **slave** station to be powered by a small photovoltaic group and is therefore particularly suitable for use in places without electricity.



While maintaining the same type of transmission structure, the system is modular and extremely flexible regarding the type and number of inputs and outputs which can theoretically vary without limits.

The following description refers features of the most generic version.



How it works

SLAVE STATION

Constantly listens for incoming command from **master** station to be executed. It has:

- Analog inputs (TTL 0-5V, 0-10V, 4-20mA)
- digital inputs (on/off contacts)
- digital outputs (on/off contacts)

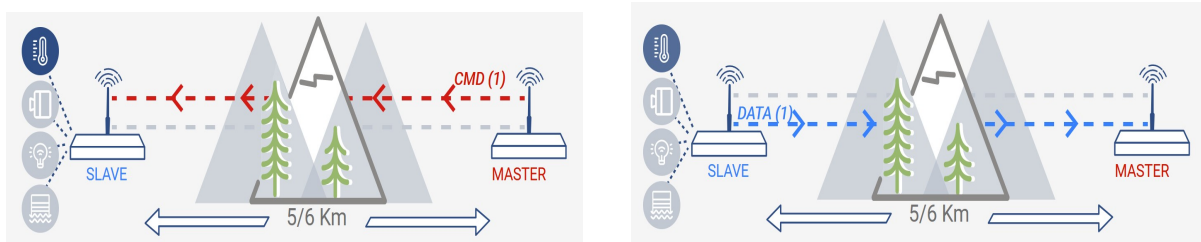
can therefore read values from any transducer using the listed standards and can send on / off commands to control devices.

MASTER STATION

Sends commands to **slave** station that executes them and returns back data (depending on command type)

Commands can be of two types:

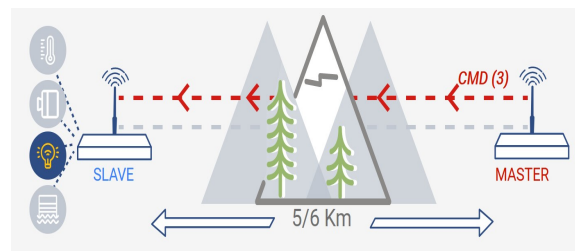
- 1) **Request to read an analog or digital input:** **slave** station samples the input indicated in the command and returns the corresponding value to **master** station



(e.g. reading temperature, water level, contacts status, etc.)



2) **Request to open or close a digital output: slave** station only execute commands without any type of feedback

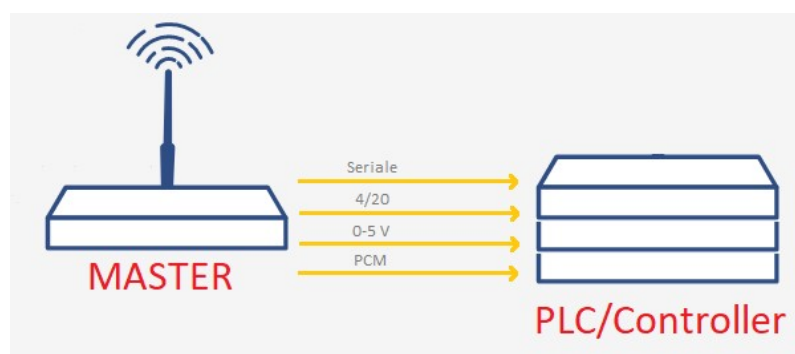


(e.g. switching on lamps, gates automation, starting engines, etc.)

Master station also has

- digital inputs (on/off contacts)
- analog outputs
- digital outputs (on/off contacts)
- serial outputs
- PWM outputs

Outputs can be optionally used to communicate with other downstream systems such as PLC / Controller



Master station communication with PLC / Controller



Direct Link ® is not only a sophisticated transmission system, it is completely programmable and it also has a high computational capacity allowing to make complex decisions and send commands when certain conditions occur. Otherwise, it can also be simply interposed transparently between the sensors / actuators and a PLC / Controller allowing them to communicate as if they were physically connected and distance them up to the maximum radio range.

Starting from this principle, the system can then be fully programmed becoming the ideal solution for a series of real use cases as exemplified in the next paragraph.



Use case examples

The Direct Link ® system is very flexible, fully programmable and is used in a wide range of very different situations.

Some of the most frequent real cases are listed below in order of complexity

- 1) **DIGITAL SIGNAL REPLICATOR (ON / OFF) from SLAVE to MASTER**: the values read from the digital inputs on **slave** station are simply replicated to the corresponding outputs on **master** station

Use Ex.: water thresholds detection by means of floats, reading of the opening / closing doors and gates status, movement detection, alarm status, etc.

- 2) **ANALOG SIGNAL REPLICATOR from SLAVE to MASTER**: the values read on the analog inputs of **slave** station are sampled and transmitted in numerical form to the **master** station which converts them back into the same analog form as they were acquired.

Use Ex.: detection of analogue thermometer values, reading of 4/20 pressure hydrometers, etc.

- 3) **SENDING DIGITAL COMMANDS (ON / OFF) from MASTER to SLAVE**: **master** station commands **slave** station to open / close certain contacts by replicating the status of digital contacts read by the **master** station

Use Ex.: engine start / stop, lights control, shutter activation, etc.



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- 4) **CYCLICAL TASKS EXECUTION**: **master** station executes a program sending commands to **slave** station on time or events basis

Use Ex.: irrigation cycles, machine downtime alarms, lighting management, etc

- 5) **VALUES / PROTOCOLS CONVERSION**: **master** station replicates on its outputs the values read on **slave** station inputs, using different values or protocols.

Use Ex.: level detection by a 4/20 hydrometer from **slave** station and communication of value via serial to a PLC located downstream of **master** station.

