Future-proof data transmission in the industrial environment

OMNIMATE® Data from Weidmüller facilitates excellent performance in the smallest possible space

More and more, devices in an industrial environment need to be made smaller, more powerful, and more economical. This poses many different challenges for device manufacturers. Despite its compact size, the connection system needs to ensure a mechanically stable connection. Currents, signals, and data must be transmitted to the printed circuit board as reliably and with as little loss as possible. At the same time, handling should be safe and convenient. In the factory of the future, machines and systems will be connected continuously via a consistent data infrastructure. Weidmüller is addressing these challenges with the extensive expansion of the OMNIMATE® Data series and supporting digitalisation in industrial environments.

Plug-in connectors for data transmission are already an integral part of any future-proof device design today. When choosing such connectors, it is important to ensure that they already consider the requirements of the future. This is the case in particular in industries, where the requirements for each individual component are growing due to consistently increasing data rates. OMNIMATE® data connectors from Weidmüller are the best solution for industrial applications. Robust RJ45 and USB jacks, Single Pair Ethernet and D-SUB plug-in connectors ensure a safe and efficient interface to your device. The entire product range is fully shielded and delivers high levels of electromagnetic compatibility. It covers all common outlet angles and has latching hooks on the top and bottom. The innovative ***STEADY****TEC*® connection system facilitates a standard design appropriate for industrial use. Customers also benefit from reliable data transmission in the high-frequency range, and optimally coordinated components for a wide range of potential applications. In the following sections, we will take a look at the unique features of the different OMNIMATE®-Data components.

Single Pair Ethernet components

In the future, all machines and systems in a factory will be connected with one another via a consistent data infrastructure. These cyberphysical systems will be able to act independently and in real time in the Industrial Internet of Things (IIoT), communicate immediately, and control production processes. For this a continuous network is required with powerful data connections from the sensor to the cloud. This is a challenge for commonly available Ethernet systems. Single Pair Ethernet (SPE) extends the Ethernet technology to the sensors and devices in the field. SPE solutions are compact, flexible, and facilitate high ranges. They allow to expand existing installations and support end-to-end communication. In contrast to regular Ethernet, SPE can also be used on the field level, as it allows for Ethernet transmission speeds using data lines of up to 1,000 meters in length. Alongside 5G technology, SPE facilitates continuous IP communication between the server and the cloud, and is able to deliver up to 60 watts of power in complex IIoT solutions with a power over data line (PoDL).

PCB sockets RJ45

A wide variety of printed circuit board sockets are required for data transmission in an industrial Ethernet environment. New trends in technology – like the shift from fieldbus to Industrial Ethernet – demand an increasing number of designs of RJ45-PCB jacks to enable adaptation to individual housing design. A wide range of different OMNIMATE®-Data RJ45 components are available. They ensure reliable transmission with high data rates of up to 1 Gbit/s and are available for all common circuit board fitting processes, such as THT, THR or SMT soldering processes. The shielded technology also allows its use in products for rough and electromagnetically noisy environments.

USB PCB jacks

OMNIMATE®-Data USB printed circuit board jacks guarantee high data transmission rates and are extremely long-lasting. They are suitable for fitting in SMT, THT, or THR soldering processes, and are a fixed part of future-proof device designs for industrial environments. Contacts with a reinforced gold layer

can be used for up to 1,500 plugging cycles. Thanks to the different outlet directions 180° (vertical) or 90° (horizontal), they are able to cover any connection situation in the device. Compatibility between USB 3.0 hosts and USB 2.0 devices allows a flexible usage.

D-SUB-PCB printed circuit board connectors

As safe and efficient device interfaces, OMNIMATE®-Data-D-SUB connectors ensure the reliable transmission of data and signals. They can be integrated into a wide range of installation situations and are available in many different designs. Established locking systems and a specialised rotational and contact protection make the connectors extremely robust. Thanks to straight and angled versions, the sockets can be integrated into any installation situation, to ensure ease of assembly. OMNIMATE® Data D-SUB connectors, therefore, are suitable for different applications like test devices, maintenance interfaces, or electronic equipment.

Ethernet PCB terminals

Ethernet PCB terminals are an affordable alternative to conventional RJ45 or M12 connections and are suitable for economical networking of industrial IoT systems. They facilitate Ethernet-conforming data transmission up to 100 Mbit/s, and are compatible with PROFINET, EtherNet/IP, or EtherCAT standards. Thanks to an integrated PUSH IN connection system, they offer high contact and vibration security, with fast and efficient wiring.

Ethernet-APL PCB terminals

Especially in the process industry, Ethernet-compatible interfaces are increasingly needed to access data from the field. This requires efficient IIoT devices with components that support Ethernet-APL.
Weidmüller offers a variety of components, which are qualified for Ethernet-APL. This includes OMNIMATE® PCB components, built-in and field attachable plugs. They provide a reliable connection to field devices using two-wire

technology. This makes plant data available in real time. Weidmüller offers the individual components with tried and tested connection technologies. Thanks to their colour-coded markings an intuitive and error-free wiring is supported.

Successful device development made easy

Rapid and reliable data transmission plays an increasingly important role for the competitiveness of industrial infrastructures. Therefore, well-developed and highly future-proof components are more important than ever for the development of new device. Weidmüller has recognised this need and provides high-quality components with OMNIMATE® Data that promise a clear added value in device design. The entire design-in process is supported with all significant information on the products, potential applications, technical details, and product data. The online catalogue, a free sample service, and an innovative AppGuide also support device manufacturers in finding suitable solutions. This is a decisive benefit for the development of industrial devices.

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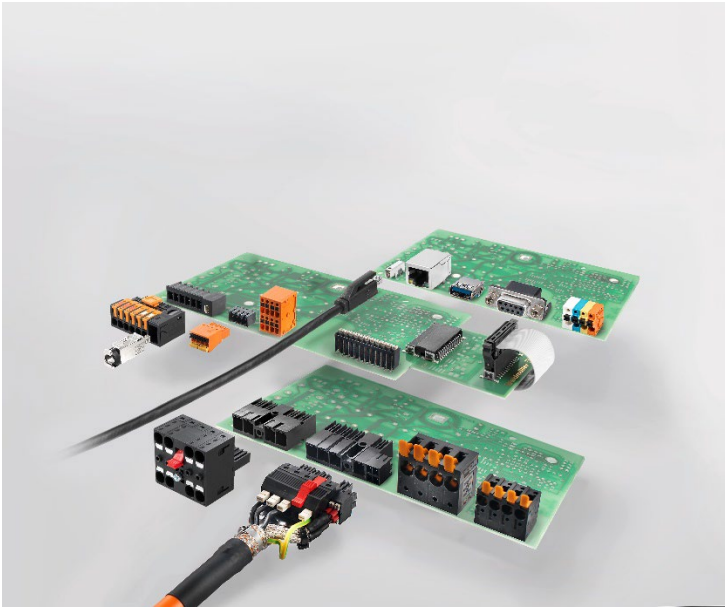

Image caption: Overview of the OMNIMATE® portfolio

Image caption: OMNIMATE® Data with Single Pair Ethernet (SPE)

Image caption: RJ45 PCB jacks

Image caption: USB PCB jacks

Image caption: D-SUB-PCB printed circuit board connectors

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Weidmüller - Your Partner in Industrial Connectivity

The Weidmüller Group has production facilities, marketing companies and representative offices in more than 80 countries. Together with our customers, we shape the digital transformation – with products, solutions and services for Smart Industrial Connectivity and the Industrial Internet of Things. In the fiscal year of 2021, Weidmüller reached sales of 960 million euros with around 5,300 employees.

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