

Exporting fieldbuses to Europe

The development of Smart Industry and the Internet of Things has created a strong demand for industrial communication networks and their components, including fieldbuses. Fieldbuses make up over two thirds of the market for industrial communication networks. Due to their relative technical complexity, fieldbuses provide good market opportunities for manufacturers from developing countries.

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1. Product description

The fieldbus is an industrial network system for real-time distributed control. It is an option to link instruments in a manufacturing plant and works in a network structure which typically allows daisy chain, star, ring, branch and tree network topologies.

In the past, computers were connected using serial connections such as RS-232. In that way, no more than two devices were able to communicate. This would be the equivalent of the currently used 4-20 mA communication scheme, which requires that each device has its own communication point at the controller level. By contrast, the fieldbus is the equivalent of the current LAN-type connections, which require only one communication point at the controller level and allow multiple (hundreds) of analogue and digital points to be connected in parallel.

This structure reduces both the length of the cable and the number of cables required. Moreover, since devices that communicate through fieldbuses require a microprocessor, multiple communication points are typically provided by the same device. Some fieldbus devices now support control schemes such as a PID controller (proportional-integral-derivative controller) on the device side, instead of requiring the controller to do the processing.

Main areas of application

- Drives
- Process devices
- Safety applications
- Test and measurement devices

Standards in use

- AS-Interface
- CAN
- FOUNDATION fieldbus
- Interbus
- LonWorks
- Modbus
- Profibus
- BITBUS
- CompoNet

- SafetyBUS
- RAPIenet

The range of standards remains fragmented with around 50 different standards overall. However, the Profibus standard developed in Germany is by far the most widespread network standard not only in Europe but also worldwide.

There is a broad range of manufacturers for fieldbuses, including [Wago](#), [Fairchild](#) and [Vishay](#).

Product specifications

Quality

Fieldbuses have a wide range of specifications. Current market requirements for fieldbuses include:

- Interoperability: ability to support diverse bus standards;
- Climatic and environmental conditions: operating temperatures between 0 and 55 °C, storage temperatures between -20 and +85 °C;
- Mechanical strength: shock and vibration resistance as well as regarding harmful substances;
- Electromagnetic compatibility and immunity to interferences;
- Size and weight optimisation.

Tips:

Comply with the relevant European Union regulations and industry-specific standards; otherwise, you will fail to enter the European market.

Make sure that your products support most of the bus standards in use. In this way, you can increase your market chances.

Labelling

The packaging of fieldbus components is typically labelled with a description of the contents, including the following types of information:

- type of product,
- model type,
- quantity,
- net and gross weight (in kilograms),
- supplier/manufacturer name,
- supplier/manufacturer location,
- serial number.

Packaging

- Fieldbus components are usually packaged in plastic bags and cardboard boxes.

2. Which European markets offer opportunities for exporters of fieldbuses?

Macroeconomic developments

The Gross Domestic Product (GDP) of the European Union totalled \$16.3 trillion in 2015, which was down from \$18.5 trillion in 2014. Overall, growth has stagnated in the European Union since 2008; however, Europe as a market remains one of the largest in the world and therefore remains an attractive market for electronics and

electrical engineering suppliers.

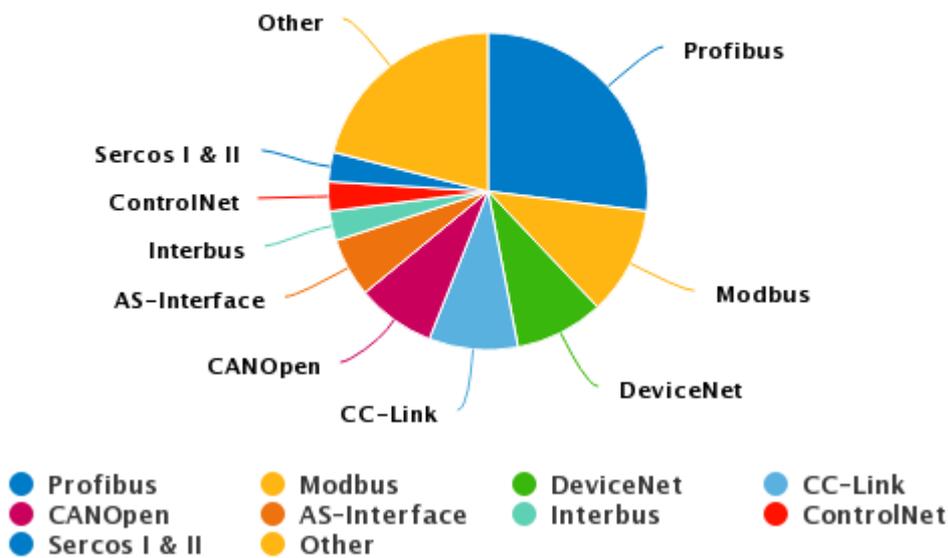
Economic recovery and digitalisation drive the demand for fieldbuses as industrial communication network components

Trade of fieldbus components currently experiences an increasing demand in the industrial production sector across Europe. Automation and digitalisation of industrial production as well as economic recovery are outstanding drivers for the demand. This includes business opportunities for investments in newly digitised manufacturing lines or upgrades of existing digitised lines.

Tip:

Reach out to potential customers to get a better insight into their demand.

Figure 1: Market for Fieldbuses in Europe (2015)



Source: HMS Industrial Networks (2015)

The Profibus standard has been, and will remain, the dominating standard in the European market. It is a universal fieldbus standard that finds broad application in the automation of production, processing and buildings. Profibus allows for communication between devices from diverse manufacturers without having interface challenges. The standard is used for time-critical as well as complex communication tasks.

Table 1: Popular fieldbus standards

Manufacturer of programmable logic controller (PLC)	Preferred fieldbus standard
Siemens	Profibus
Rockwell Automation	DeviceNet, ControlNet
Mitsubishi Electric	CC-Link
Schneider Electric	Modbus, CANopen
Phoenix Contact	Interbus
Bosch Rexroth	Sercos

There is a broad range of fieldbus standards that are present in the market and that have penetrated the market. These standards were introduced by diverse manufacturers.

Tips:

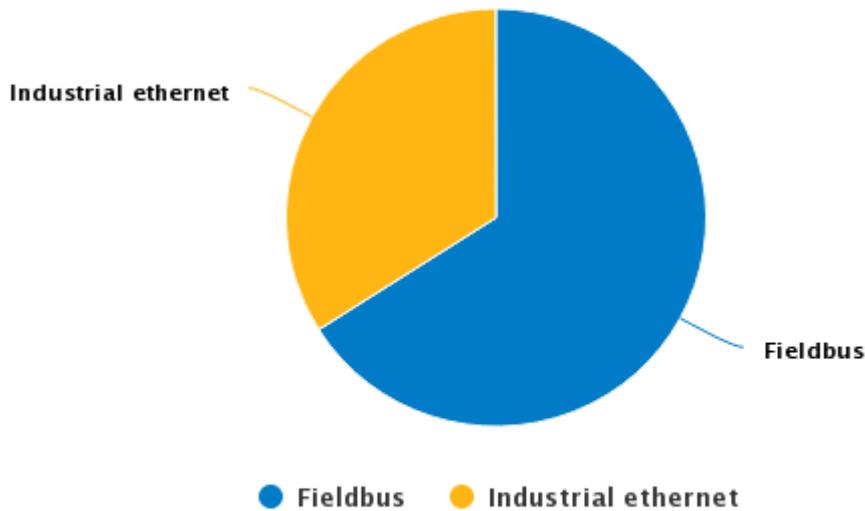
Connect with the PLC manufacturers to explore ways of cooperation or get familiar with the standard requirements.

Attend trade fairs such as [Hannover Messe](#) to gain market exposure and to inform yourself of the specifics of demand in Europe.

See our study of [Finding Buyers in Europe](#) for more information about entering the European Electronics and Electrical Engineering market.

The fieldbus is the dominating industrial communication network standard, covering two thirds of the entire market. It is the oldest standard and experiences a much stronger market penetration than the younger industrial Ethernet. Fieldbus is an established and popular standard among its users.

Figure 2: Market for Fieldbus and Industrial Ethernet in Europe
(2015)



Source: HMS Industrial Networks (2015)

The strongest demand for fieldbuses comes from the countries with the largest industrial production in Europe – France and Germany. Both countries have a strongly diversified industrial production, ranging from strong automotive production to food production. These two major markets for fieldbuses are strongly driven by fieldbus standards that have their origin in these countries. This is why Germany is strongly dominated by the Profibus standard (estimated market share over 50%) developed by the originally German and now multinational Siemens company, whereas France is dominated by the Modbus standard (estimated market share over 50%) developed by the Schneider Electric company.

Relative to the fact that fieldbus applications continue to have a larger market share than the more innovative Ethernet, production industries have different demand levels with regard to these technologies. Automotive is a highly innovative sector which experiences technology updates on a regular basis due to the introduction of new car models. This is also the reason why Ethernet has a higher market share in this sector than for example in food or chemical production.

3. What trends offer opportunities on the European market for fieldbuses?

The Industrial Internet of Things, or Industry 4.0, drives demand

Fieldbus components are one of the major beneficiaries of the Industrial Internet of Things (IIoT) trend. In Germany, this trend is also known as Industry 4.0. As this trend connects more and more industrial devices, the need for industrial communication networks is vital and one of the key enablers.

A complex automated industrial system such as a manufacturing assembly line usually needs a distributed control system – an organised hierarchy of controller systems – to function. In this hierarchy, there is usually a Human Machine Interface (HMI) at the top, where an operator can monitor or operate the system. This is typically linked to a middle layer of programmable logic controllers (PLCs) via a non-time-critical communications system (for example, Ethernet). At the bottom of the control chain is the fieldbus that links the PLCs to the components that actually perform the work, such as sensors, actuators, electric motors, console lights, switches, valves and contactors.

Alternatives - Ethernet applications grow more rapidly than fieldbus applications

Ethernet applications are an alternative to fieldbus applications and have put the latter under pressure in the market for industrial networks. With an annual growth rate of 17%, Ethernet applications grow more than two times as rapidly as fieldbus applications, which grow at an annual rate of around 7%.

Ethernet outperforms fieldbus as an industrial communication network in terms of higher performance and ability to integrate with office networks. However, the migration towards Ethernet as the advanced network application standard is taking a long time. Reasons behind this delay are the continuing popularity of the fieldbus, due to its simplicity and reliability, as well as the fact that customers are used to this system.

Tips:

- Make sure that you don't miss developments in the Ethernet sector while serving the fieldbus market.
- See [our study about trends in the Electronics and Electrical Engineering sector](#) for more information.

4. What requirements should fieldbuses comply with to be allowed on the European market?

To assure reliability, efficiency and safety, fieldbuses must comply with the relevant European Union regulations and sector standards. Compliance with European legislative and non-legislative requirements is a basic necessity when exporting fieldbuses to the European market. Some requirements apply to all electronic and electrical engineering products, while others are specific to fieldbuses.

Here is an overview of the requirements that apply to all electronic and electrical engineering products, including fieldbuses.

Legal requirements:

- Liability for defective products;
- CE marking;
- Waste of Electrical and Electronic Equipment (WEEE);
- Restriction of the use of certain hazardous substances in electrical and electronic equipment (RoHS) and Registration, Evaluation, Authorisation and Restriction of Chemicals (REACH).

Non-legal requirements:

- Quality management systems (QMS) - ISO 9001;
- Occupational health and safety (OHS) in the electronic components sector;
- Electronic Industry Citizenship Coalition (EICC) Initiative.

Specific certifications required in application industries

There are standards and requirements that apply to all electronic and electrical engineering products in applications industries. Manufacturers and associations have agreed on these in Europe but also beyond. It is necessary to comply with these certifications when targeting potential customers in these industries.

For automotive applications, the following specific standards apply:

- [ISO/TS 16949](#) - fuses within assemblies, sub-assemblies and finished goods must meet the quality demands

outlined;

- [ISO 26262](#) requirements focus on the functional safety of electrical and electronic systems in vehicles.

For rail applications, the following specific standard apply:

- [IRIS](#) – the International Railway Industry Standard.

For aviation applications, the [following specific standards](#) apply:

- EN/AS 9100 certification (for development, production, manufacturing, installation, construction and maintenance);
- EN/AS 9110 certification (for maintenance operations and service organisations);
- EN/AS 9120 certification (for traders, storekeepers and distribution).

See our study of [buyer requirements in the Electronics and Electrical Engineering sector](#) for more information and tips.

Requirements that apply specifically to fieldbuses

There is a range of non-legal requirements for fieldbuses. These are standards defined by the industry or sector that are in practice as important as legal requirements, as they ease procurement for buyers tremendously.

- IEC 60068-2-42 and IEC 60068-2-43: Exposure to hazardous substances;
- EN 61000-6-4: Electromagnetic compatibility (EMC) transient emissions;
- EN 61000-6-2: Electromagnetic compatibility (EMC) interference resistance;
- IEC 60068-2-27: Shock resistance;
- IEC 60068-2-6: Vibration resistance;
- IEC 61784: Communication profile family (CPF);
- IEC 61158: Classification for layers;
- ISO 7498: Common basis for the coordination of standards development for the purpose of systems interconnection.

Tips:

Comply with the standards if you plan to supply customers in the market segments mentioned.

Visit the [EU Export Helpdesk](#) for more information on standards.

5. What competition do you face on the European fieldbus market?

Fieldbuses are a highly volume-based product in terms of sales. It therefore makes sense to choose a low-price, high-volume sales approach with regard to the European market.

See our study of [competition in the Electronics and Electrical Engineering sector](#) for more information.

6. Through what channels can you get fieldbuses on the European market?

Selling fieldbuses through distributors helps exporters from developing countries to save resources and reach a broad range of customers.

See our study of [segments and channels in the Electronics and Electrical Engineering sector](#) for more

information.

7. What are the end-market prices for fieldbuses?

Prices of fieldbus components vary depending on their characteristics. Within each product group, they also differ significantly in price.

Table 2: Prices of fieldbuses

Key fieldbus components	Original Equipment Manufacturer (OEM), volume price range, in €
Fieldbus coupler	100-300
Fieldbus controller	150-1500

You will have to be aware of differences in costs and value chain margins that need to be considered when calculating the product price. The production and administration costs of the manufacturer usually account for 45-50% of the end price (OEM volume price). The production and administration costs include all costs for raw materials, development and labour, as well as other fixed and administration costs.

Table 3: Breakdown of prices

OEM volume price breakdown	Margin
Production and administration costs	45-50%
Marketing and sales costs in developing countries	3%
Freight to Europe and other related costs	6%
Import and other costs (for example, VAT, financing)	5%
Marketing costs in Europe	8%
Importer margin	8-10%
Distributor margin	15-25%

Tips:

Develop a unique selling proposition based on price and service, while considering your costs, liabilities and responsibilities.

Make sure that you analyse product market price levels when coming up with a selling proposition.

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