IDX Industrial Data Xchange
The Industrial Data Communications Experts

PROFINET Brochure
2025

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About PROFINET

Scalable, seamless communication for industrial automation.

Smarter Connectivity for Automation with PROFINET

Process Field Network (PROFINET) is an open Industrial Ethernet standard for high-performance automation and industrial communication. As an evolution of traditional fieldbus systems, it offers high-speed, scalable, and flexible data exchange, making it a preferred choice for modern applications.

By integrating field devices, controllers, and enterprise systems, PROFINET optimises process control. It supports factory automation and process industries, ensuring reliable, deterministic communication for mission-critical tasks.

PROFINET ensures precise, deterministic data exchange while providing insights into data quality and asset health for proactive maintenance. Instead of reacting to failures, users can address issues in advance, reducing downtime.

Built on common Information Technology (IT) standards, PROFINET supports Real-Time (RT) Ethernet for time-sensitive processes and User Datagram Protocol/Internet Protocol (UDP/IP) for Non-Real-Time (NRT) communications, such as system configuration. It connects Programmable Logic Controllers (PLCs), Distributed Control Systems (DCSs), Input/Output (I/O) blocks, vision systems, Radio-Frequency Identification (RFID) readers, drives, proxies, and much more.

Interoperability   Permanent Monitoring

Increased Efficiency   Advanced Diagnostics

PROFINET Benefits

• High-speed, real-time data transmission

• Deterministic communication

• Scalable for various applications

• Supports diverse field devices

• Enhanced diagnostics and monitoring

• Proactive maintenance insights

• Compatible with many industrial protocols

• Easy integration with automation networks

• Lower wiring and installation costs

• Reduced downtime, increased efficiency

• Improved process control

PROFINET Benefits

Reliable communication, minimising disruptions and enhancing efficiency.

Maximising Efficiency for Seamless Industrial Operations

Synchronised Operations

PROFINET ensures precise, predictable data delivery, guaranteeing critical messages reach their destination exactly when needed. This reliability is essential in industries where strict timing and synchronisation are crucial, such as manufacturing and automation.

By enabling real-time communication, PROFINET minimises latency, reduces errors, and optimises workflows, ensuring smooth coordination, system stability, and enhanced productivity.

Stable Communication

Designed for industrial environments, PROFINET ensures consistent, dependable communication, minimising disruptions and enhancing system reliability. Its robust architecture reduces downtime and prevents costly operational interruptions.

With advanced fault detection and redundancy features, PROFINET maintains stable operations, ensuring continuous data flow for smooth, efficient, high-performance industrial processes.

Seamless Integration

PROFINET uses standard Ethernet technology to integrate with existing systems, supporting legacy and modern equipment. This reduces infrastructure costs, enhances interoperability, and makes automation operations more efficient.

Real-Time Precision and Efficiency

PROFINET enables real-time data transmission with rapid response times, ideal for robotics, motion control, and critical processes. Its timely data ensures coordination between devices, optimising performance and reducing delays.

Continuous Network Monitoring

Built-in diagnostic tools offer continuous network monitoring, identifying faults such as device failures, network congestion, and communication errors, helping to minimise downtime and ensure smooth, efficient operations.

Flexible Network Topologies

PROFINET supports multiple topologies, including line, ring, star, and tree, allowing seamless adaptation to networks of various sizes and simplifying network expansion and upgrades for diverse industrial environments.

PROFINET RT, TSN and APL

Advanced networking solutions for industrial process efficiency.

PROFINET RT, TSN AND APL

PROFINET has three variants: PROFINET Real-Time (RT), PROFINET Time-Sensitive Networking (TSN), and PROFINET Advanced Physical Layer (APL). PROFINET RT provides fast, deterministic automation, PROFINET TSN enhances real-time performance over standard Ethernet, and PROFINET APL enables long-distance, intrinsically safe Ethernet in hazardous environments.

PROFINET Real-Time (RT)

PROFINET RT is a communication protocol designed for industrial automation, ensuring timely and deterministic data exchange between controllers and devices. Unlike standard Transmission Control Protocol/Internet Protocol (TCP/IP) communications, which may cause variable delays, PROFINET RT bypasses these layers, offering faster and more predictable performance.

PROFINET Time-Sensitive Networking (TSN)

PROFINET TSN enhances industrial automation with very high-speed, real-time communication, making it ideal for robotics and motion control. It ensures low latency, precise synchronisation, and reliable data transmission over standard Ethernet, enabling seamless integration of deterministic and converged networks in industrial environments.

PROFINET Advanced Physical Layer (APL)

PROFINET APL brings Ethernet to the process industry with a 2-wire, 10 Mbps solution that delivers data and power over the same cable. It enables long-distance, intrinsically safe communication, ensuring reliable connectivity for field devices in hazardous environments.

PROFINET RT Benefits
- High speed and precision: Cycle times from 250 µs to 10 ms, jitter under 100 µs.
- Standard Ethernet: No specialised hardware is required.
- Industrial use: Ideal for motion control and high-performance I/O.

PROFINET TSN Benefits
- Very high speed: Enables real-time communication for robotics and motion control with low latency.
- Deterministic networking: TSN ensures precise synchronisation for time-critical applications.
- Converged networks: Uses standard Ethernet, allowing multiple protocols to coexist without interference.

PROFINET APL Benefits
- Faster communication: Speeds up to 10 Mbit/s, more reliable than HART or fieldbus.
- Supports digitalisation: Enables Ethernet at the field level for better data management.
- Easy integration: Works with PROFINET protocols and existing PROFIBUS PA wiring.

Overview of IDX

Unlocking data-driven industrial excellence with innovative smart solutions.

Operational Excellence Unlocked Through Industrial ICT Solutions

Industrial Data Xchange (IDX) stands out for its expertise in delivering customised industrial ICT solutions, tailored for a wide range of industries including agriculture, automotive, energy, food and beverage, general manufacturing, mining and metals, oil and gas, paper and pulp, as well as petrochemical and supply chain logistics.

Our expertise lies in establishing, maintaining, and leveraging data, enabling plants across various sectors to transform raw plant data into actionable insights. We offer comprehensive PROFINET solutions, services, training, and products to support industries in unlocking the full potential of this communication protocol, driving operational excellence.

At IDX, our vision is Operational Excellence Unlocked. We understand the importance of minimising downtime and maximising productivity in industrial settings. Through our innovative solutions, we work alongside you to streamline processes, enhance efficiency, and reduce costly downtime. By harnessing the power of data, we empower your plant and employees to operate at their full potential, ensuring that every moment counts and every resource is utilised effectively.

Whether you need PROFINET components, network design guidance, or training for your team, IDX provides a holistic approach to PROFINET integration and optimisation, ensuring your plant remains competitive, efficient, and aligned with the principles of operational excellence.

IDX PROFINET Offering

Solutions
- Data collection, routing and management
- Permanent monitoring
- Production line optimisation and balancing

Services
- Network commissioning, diagnostics and segmentation
- PROFINET network audits
- PROFINET network call outs

Training
- Certified PROFINET Engineer

Products
- Permanent monitoring devices
- Diagnostic tools
- Ethernet switches
- PROFINET cable and connectors
- PROFINET cable testers

PROFI NET®

IDX Industrial Data Xchange
The Industrial Data Communications Experts

PROFINET Products

Permanent Monitoring

Atlas2 Plus

The Anybus Atlas2 Plus enables remote permanent monitoring of industrial networks, detecting faulty installed devices, misconfigurations, and cable and firmware issues. It learns diagnostic patterns for preventive maintenance and provides topology insights, accessing single device information such as traffic, data exchange, link connectivity, performance trends, error rates, bandwidth usage, and overall network health.

EtherTAP2

The Anybus EtherTAP2 is a permanent monitoring interface designed for in-depth analysis of PROFINET and EtherNet/IP traffic. It provides passive diagnostics, filtered message recording based on custom triggers, and insights into network traffic, jitter, dropped packets, cycle times per device, error detection, latency issues, data flow patterns, and network performance optimisation.

Analysis Tool

EtherMIRROR

The Anybus EtherMIRROR is a transparent measuring point for industrial networks running on PROFINET or EtherNet/IP. With a full-duplex mirror port, it enables immediate tap access for mobile monitoring and troubleshooting. Easily deployed, it provides a simple, single-cable solution for efficient network diagnostics, analysis, and real-time performance monitoring without disruption.

Switches

Managed Ethernet Switch

The Teltonika TSW212 is a managed Ethernet switch with L2 and additional L3 features, including DHCPv6 client support and static IPv6 routing. Supporting PROFINET, EtherNet/IP, and Media Redundancy Protocol, it has eight gigabit Ethernet ports and two small form-factor pluggable ports for stable long-distance fibre optic communication. Designed for industrial use, it offers advanced management and flexible configuration options.

Managed Power over Ethernet (PoE) and Ethernet Switch

The Teltonika TSW202 is a managed PoE and Ethernet switch that centralises power distribution while offering advanced network management. With eight PoE and gigabit Ethernet ports delivering 30W each and two small form-factor pluggable ports for fibre connections, it supports PROFINET, EtherNet/IP, and Media Redundancy Protocol. Designed for flexibility, it ensures reliable industrial networking.

PROFINET Products

Cables and Connectors

PROFINET Cables

Built with premium materials and compliant with industry standards, PROFINET cables deliver exceptional noise resistance for reliable and uninterrupted communication. Designed for industrial networks, they ensure high-speed data transmission, durability, and flexibility, making them ideal for demanding automation environments, including motion control and real-time applications.

PROFINET Connectors

This 180° connector ensures efficient PROFINET connectivity with secure data transfer. Fully shielded and multi-port capable, it features easy assembly with no special tools required. The rugged, metal enclosure offers durability and resistance to electromagnetic interference, supporting fast cable installation via the FastConnect piercing system for reliable connections.

Cable Testers

The NaviTEK IE tester simplifies commissioning, maintenance, and troubleshooting of PROFINET and standard Ethernet IP networks. Without needing a computer, it identifies network nodes, detects faults, and prevents failures with a health check. Generate Portable Document Format (PDF) reports, pinpoint cable issues, locate misconfigured or rogue devices, and ensure optimal network performance.

Solutions

Comprehensive data management and monitoring solutions.

Seamless Data Management and Real-Time Monitoring

Data Collection, Routing and Management

IDX enables data flow and connectivity for PROFINET networks, ensuring communication between devices and integration across industrial environments. Our solutions optimise network performance, enhance interoperability, and support real-time data exchange, enabling plants to maintain high efficiency.

Our flagship software, IDX Nexus, offers powerful tools for plants to enable data collection, routing, management, trending, dashboards, and alerting. IDX Nexus simplifies complex data management tasks, making them intuitive, and helping plants harness real-time information for operational continuity.

Permanent Monitoring

Our Permanent Monitoring solution provides 24/7 oversight of your PROFINET network, offering real-time monitoring from anywhere in the world. By detecting issues before they arise, it ensures proactive maintenance and swift issue resolution, significantly reducing unplanned downtime and associated costs. This solution helps maintain high network performance and reliability, driving operational excellence.

With centralised management, configurable controls, and live data, plant employees can monitor their PROFINET systems remotely, ensuring smooth automation and optimal network health. By identifying potential issues early, a permanent monitoring solution can save money, enhance system efficiency, and improve overall network stability.

IDX NEXUS Software Suite

The IDX Nexus software suite is composed of three main components, each working together to provide comprehensive data management tools for industrial plants:

- Nexus Connectivity: Facilitates seamless data flow between disparate systems, serving as the backbone of the Nexus framework for efficient data exchange.

- Nexus Historian: An efficient data historian that logs data tags indefinitely, featuring a tag compression toolkit for optimised storage and management.

- Nexus Visualisation: Displays trends of logged data tags and creates intuitive, vibrant dashboards for plant data review, monitoring, and control.

Capabilities

- Store plant tag data efficiently
- Unlimited data tag storage
- Real-time data routing
- Route data between disparate systems
- Design intuitive and dynamic dashboards
- Visualise and analyse data trends
- Enable remote monitoring capabilities
- Local or cloud-based storage
- Manage quality alarming and alerting systems for tagged data

Services

Reliable and scalable communication for optimal performance.

Delivering Resilient and Secure Networks

Network Commissioning, Diagnostics and Segmentation

IDX delivers engineering support for designing, commissioning, and optimising PROFINET networks. Whether you are implementing a new installation or expanding an existing one, we ensure seamless integration and reliable performance.

Our expertise helps plants enhance connectivity, streamline data flow, and maintain efficient operations through tailored solutions. We specialise in industrial communication, ensuring that your network infrastructure supports real-time data exchange, minimises downtime, and improves overall system efficiency.

PROFINET Audits

Beyond implementation, we offer troubleshooting, system health assessments, and performance optimisation to keep your PROFINET network running smoothly.

Our engineers diagnose faults, identify vulnerabilities, and recommend proactive improvements to prevent costly disruptions. With expert support, tools, and years of experience, IDX ensures your PROFINET systems operate at peak efficiency.

PROFINET Callouts

With specialisation in resolving complex breakdowns, our team have the knowledge and tools to diagnose and repair issues on-site. We quickly identify faults, implement solutions, and minimise downtime, keeping operations running smoothly.

In addition to repairs, we optimise network performance and provide expert solutions for seamless industrial communication. Our assessments help prevent failures, ensuring your PROFINET network stays efficient and scalable.

Network Performance and Reliability
- Improved network performance
- Increased stability and reduced downtime for industrial communication systems
- Enhanced system reliability, reducing breakdowns
- Optimised networks lower energy consumption and resource utilisation

Fault Detection and Troubleshooting
- Rapid fault detection and resolution
- Advanced diagnostic tools
- Efficient troubleshooting reduces expensive repairs and system overhauls

Maintenance and Downtime
- Reduced downtime and fewer interruptions
- Proactive maintenance prevents unexpected failures
- Minimise production delays by identifying and resolving issues before they escalate

Engineering Expertise
- Access to highly skilled, certified PROFINET engineers

Network Understanding and Clarity
- Easy to identify system interconnections
- Simplifies understanding with network diagrams

Training

Master PROFINET networks with practical and hands-on training.

Enabling Productivity through Active Learning

Established in 2001, the IDX Academy develops and teaches accredited courses, which combine both the theoretical and practical skills required, to manage any industrial network.

IDX's technical training solutions can help simplify the process so that you cost-effectively achieve operational excellence.

Certified PROFINET Engineer

The Certified PROFINET Engineer Course is a comprehensive three-day, hands-on training program designed to equip individuals with the skills to design, install, commission, and troubleshoot a PROFINET network.

This course provides an in-depth view of the PROFINET network, focusing on installation guidelines, Ethernet basics, and the infrastructure required for a successful network setup. Participants gain practical experience using demonstration boards that simulate real-world industrial environments, helping them understand Ethernet basics, network components, time scheduling and sequences.

Students also learn to work with key technologies like IWLAN, SNMP, and LLDP, while gaining a solid understanding of the PROFINET protocol, message structure, and network components.

In addition, the course covers troubleshooting techniques, network failure identification, and the use of diagnostic tools and remote monitoring solutions. Advanced sessions on PROFINET isochronous real-time systems and GSD files equip attendees with the knowledge to optimise network performance.

Certification
Receive an internationally recognised certificate after passing the theoretical and practical examinations.

CPD Points
Students can earn three ECSA-accredited CPD points for this course.

PROFINET International Competence Centre

Established in 1989, PROFIBUS and PROFINET International (PI) is the largest global automation community. PI manages and develops PROFIBUS and PROFINET standards to uphold professional regulations and optimise efficiency.

In 2004, the IDX Academy received its certification from PI becoming the first and only Certified PROFIBUS International Competence Centre (PICC) in Africa.

With the emergence of PROFINET, the IDX Academy extended its portfolio and became a Certified PROFINET International Competence Centre (PICC) in 2011.

The IDX Academy is Africa's first, and the only, PICC with the scale and portfolio to deliver comprehensive, integrated, and industry-leading industrial training solutions.

Resources

Upskill yourself with our comprehensive PROFINET resources.

Empowering Industrial Connectivity and Efficiency

Enhance your skills and expertise with our resources meticulously crafted by our team of expert engineers, dedicated to providing you with the highest quality and most reliable information available.

By leveraging their expertise, we aim to empower you with the tools and knowledge necessary to succeed in implementing and optimising PROFINET networks.

Explore these free resources today and unlock the full potential of PROFINET technology.

Articles
Stay informed with our articles, covering a wide range of PROFINET-related topics and perspectives to stay ahead in the evolving automation landscape.

Case Studies
Discover real-world success stories through our compelling case studies, showcasing how plants like yours have leveraged PROFINET to achieve remarkable results.

Guides and White Papers
Access essential knowledge and insights with our comprehensive guides and white papers, enabling you to optimise PROFINET networks for maximum efficiency.

Learning Benefits

- Identify and troubleshoot problems faster
- Improve cost of ownership
- Become more efficient at handling tasks
- Increase efficiencies in processes
- Pass on new skills to the team
- Build leadership ability
- Uniformity of work processes
- Boost productivity

Technical Specifications
Simplify PROFINET network operations with our technical specifications, offering seamless guidelines and standards.

Technical Tips Videos
Boost your PROFINET skills by watching our practical technical tips videos, featuring expert advice to troubleshoot your network.

Training Videos
Level up your PROFINET expertise by watching our training videos equipping you with essential skills for network implementation and management.

Read now: https://blog.idx.co.za

Watch now: www.youtube.com/industrialdataxchange

Contact

Contact us today. We would love to assist you in achieving your plant goals with our expertise.

Operational Excellence Unlocked

IDX goes beyond being an ICT solutions provider; as a strategic partner, we guide you towards a more connected and data-driven industrial future.

Our vision is clear: Operational Excellence Unlocked. We help plants achieve peak performance by providing the technology, tools, and data-driven strategies necessary for long-term success.

In today's fast-paced industrial landscape, data is key to success. Our goal is to equip plants with the tools and infrastructure needed to collect, analyse, and act on data in real-time, driving growth and resilience.

IDX is committed to continuous innovation, staying ahead of technological advancements to ensure that your plant remains competitive. We understand the challenges that come with a rapidly changing industrial environment and work closely with you to implement solutions that not only meet your current needs but also position you for future success.

With decades of experience in industrial ICT solutions, we have a proven track record of delivering measurable results, enhancing performance, and catalysing innovation across multiple industries.

Let us be your partner in establishing, maintaining, and leveraging connectivity within your plant infrastructure. With IDX by your side, your workforce can maximise the potential of your assets, transforming data into a powerful driver of operational excellence.

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The Industrial Data Communications Experts

Contact Information

1 Weaver Street, Fourways, Johannesburg, South Africa

(+27) 11 548 9960

info@idx.co.za

www.idx.co.za

Join our Community

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