HIRSCHMANN
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Training and Certification Program

Your Success is in Good Hands

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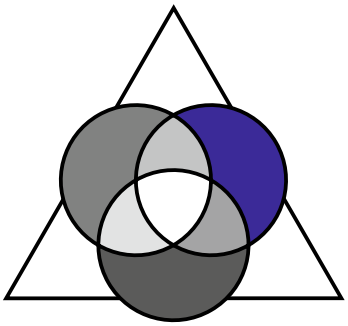
First-hand Technical Knowledge – Made to Measure Worldwide



Low-cost, high-benefit: Training and certification increase your on-site competence.

Dear Network Experts,

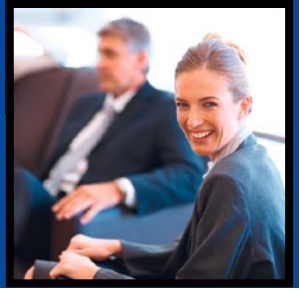
New technologies are new opportunities. Industrial Ethernet is a specialized branch of the Ethernet tree, and one that requires knowledge across disciplines that were previously unrelated. For the small number of people with that unique combination of industrial and Ethernet experience, the rewards are high. But how do you prove your competence? The answer is the same for each branch of the IT Industry.

Industrial Ethernet Certification not only proves your Ethernet skills, but demonstrates a breadth of knowledge which encompasses fieldbus and real-time technologies, TCP/IP in industrial environments, industrial network management, network security, wireless LANs, structured cabling and network design, and the stringent demands of mission-critical industrial networks. Since 2003, Hirschmann™ has issued over 1800 certificates to more than 600 people from 47 countries.

But Industrial Ethernet Certification means more than just demonstrating your competence to your present or future employers. A company which employs certified engineers can rest assured that its network is in the hands of a certified industry professional. A reseller or distributor can inspire the confidence of its customers by highlighting the proven competence of its support engineers and designers.

Now is the time to acquire a command of Industrial Ethernet! Made to measure, practically oriented, international. Wishing you every success.

Wolfgang Schenk
Managing Director
Hirschmann Automation and Control GmbH



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You will find an overview of our training courses and dates at **www.hicomcenter.com**.

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The Hirschmann™ Certification Scheme – Unique Proof of Competence

What qualifications would you like to demonstrate? At Hirschmann™ you can find the right certificate: for any field of expertise at any level.

Why a Certification?

The best form of protection against expensive downtime in a modern industrial network is the assurance of on-site specialists and external service providers qualified to quickly rectify faults, or to prevent them from ever happening. Not every self-proclaimed "Expert" is up to the task. A certification from Hirschmann™ is confirmation of genuine, up to the minute expertise.

Who Can Become Certified?

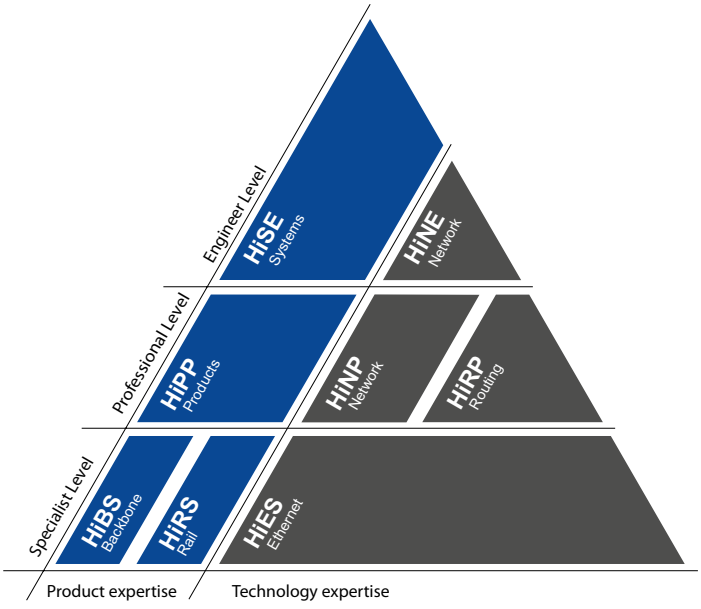
Knowledge is in the heads of individuals. This is why we always certify people, and never companies. The Hirschmann™ certification exams are open to everyone. Certification is especially recommended for network designers and administrators, who as employees or external service providers are responsible for the availability of industrial networks.

What Types of Certification are Possible?

The Hirschmann™ Certification Scheme is divided into two distinct areas: general technology expertise, and specific product expertise. Three qualification levels are available. The "Specialist" certificate proves solid basic knowledge, the "Professional" a deeper understanding, and the "Engineer" comprehensive expertise in the respective field. A complete overview is shown below.

Do I have to Attend the Training Courses?

No. The Hirschmann™ training program includes several seminars which are recommended as part of your preparation for specific exams (these can be recognized by the certification logo). However attending a training course is not a prerequisite for taking an exam. The reverse is also true. Knowledge acquisition and proof of knowledge are independent of each other. You only need to attend training if you do not already have the knowledge.



Certified Technology Know-how

Certificate	Description	Prerequisite	Training (if required)
HiES – Hirschmann™ Industrial Ethernet Specialist	This initial qualification stage confirms basic skills in the application of Ethernet, redundancy, VLANs, and prioritization. A Hirschmann™ Industrial Ethernet Specialist (HiES) is capable of supervising switched networks, detecting, localizing and remedying faults quickly and efficiently.	HiES Examination	Industrial Ethernet (CT1)
HiNP – Hirschmann™ Industrial Network Professional	For big, mission-critical networks, in-depth expert knowledge is required. The Hirschmann™ Industrial Network Professional (HiNP) possesses all these qualifications, as well as having a command of IP communication, TCP/IP, multicasting, network requirements of Industrial Protocols, and security.	HiES Certification + HiNP Examination	Industrial Networking (CT2)
HiRP – Hirschmann™ Industrial Routing Professional	For complex routed networks you will need expert knowledge in the field of IP communications. A qualification as Hirschmann™ Industrial Routing Professional will give you the necessary expertise to sell networks with dynamic routing protocols for unicast and multicast data.	HiES Certification + HiRP Examination	Industrial Routing (CT3)
HiNE – Hirschmann™ Industrial Network Engineer	The Hirschmann™ Industrial Network Engineer (HiNE) is the highest qualification level awarded in the technology section. It links the comprehensive expertise of the Network Professional (HiNP) and the Routing Professional (HiRP): from design and implementation through commissioning to the continuous supervision of complex networks.	HiES, HiNP and HiRP Certifications	Professionals certified to HiES, HiNP and HiRP automatically receive the HiNE certification, without sitting an additional exam.

Certified Product Know-how

Certificate	Description	Prerequisite	Training (if required)
HiRS – Hirschmann™ Industrial Rail Specialist	A Hirschmann™ Industrial Rail Specialist (HiRS) is able to offer wide-ranging expertise in all Layer 2 functionality of Hirschmann™ switches. These products are generally located in the immediate vicinity of automation systems and machines, and include a broad range of platform devices: Rail Switches, OCTOPUS, PowerMICE and MACH Family.	HiRS Examination	Rail Family (CP1)
HiBS – Hirschmann™ Industrial Backbone Specialist	A Hirschmann™ Industrial Backbone Specialist (HiBS) possesses the expert Layer 3 knowledge needed to commission, operate, and maintain networks with routers from the Hirschmann™ backbone range. Due to the wide functional scope of these devices, the certification offers proof of sound detailed knowledge in fields including routing, network security and Layer 3 redundancy techniques.	HiBS Examination	Industrial Backbone Devices (CP3)
HiPP – Hirschmann™ Industrial Product Professional	The interaction of different products in an ideally configured network calls for interdisciplinary know-how. A Hirschmann™ Industrial Product Professional (HiPP) is able to offer this qualification, mastering the supervision and management of Industrial Ethernet using the Hirschmann™ network management platform Industrial HiVision, whether as a stand-alone tool or in conjunction with other SNMP tools and SCADA software.	HiRS Certifications + HiPP Examination	Network Management with Industrial HiVsion (CP2)
HiSE - Hirschmann™ Industrial Systems Engineer	The highest qualification awarded for Industrial Ethernet experts is the Hirschmann™ Industrial Systems Engineer (HiSE). This certification is awarded only to candidates who have provided comprehensive proof of their competence both in the technological field (HiNE) and also in the product sector (HiPP, HiRS, HiBS). This qualification testifies to the holder's ability to design, commission and competently supervise networks of any magnitude and complexity containing Hirschmann™ products.	HiPP, HiRS, HiBS and HiNE Certifications	Holders of these certificates automatically receive the HiSE certification, without sitting an additional exam.

Training Courses

	Industrial Ethernet (CT1)
Objective	In this Industrial Ethernet course the participants will learn details of the technical fundamentals and deployment objectives of the world's most widely used LAN communication protocol. At the end of the course the participants will have a good understanding of Ethernet, as well as its role in industrial networking, both now and in the future. For additional topics related to Industrial Ethernet, the participant should attend the "Industrial Networking" (CT2) training course.
Prerequisites	No previous knowledge of the subject is required.
Seminar Content	The Physics of Ethernet: • Copper-based networks • Fiber-based networks • Physical Interfaces • Bandwidth/Speed • Half duplex and full duplex • Ethernet Frame • Understanding MAC addresses Ethernet in half duplex mode: • Ethernet access method: CSMA/CD • Hubs Ethernet in full duplex mode: • Autonegotiation • Switches • Switching Mechanisms • Forwarding Database • Latency Network Availability: • Topologies • Rapid Spanning Tree • Multiple Spanning Tree • Link Aggregation • Industrial Redundancies (MRP, PRP, HSR) Traffic Control: • Flow Control • VLANs • Quality of Service
Duration	2 Days
Certification	Recommended for the Hirschmann™ Industrial Ethernet Specialist certification examination.

	Industrial Networking (CT2)	Industrial Routing (CT3)
Objective	This course builds on the experience gained from “Industrial Ethernet” (CT1), providing network experts with intensive theoretical and practical knowledge about TCP/IP, IP communication and multicasting. A special emphasis is placed on deploying TCP/IP and multicasting in complex industrial environments. This enables the participants to provide comprehensive support, both for demanding projects and their daily work.	This course builds on the experience gained from “Industrial Networking” (CT2), providing network experts with intensive theoretical and practical knowledge about unicast and multicast routing. A special emphasis is placed on deploying routing protocols in complex industrial environments. This enables the participants to provide comprehensive support, both for demanding projects and their daily work.
Prerequisites	Basic knowledge is required, for example previous attendance of the “Industrial Ethernet” (CT1) course.	Basic knowledge is required, for example previous attendance of the “Industrial Networking” (CT2) course.
Seminar Content	Internet Protocol: • IP Packet • IP Addresses • Netmask • Classless Inter Domain Routing (CIDR) • DiffServ IP communication: • Address Resolution Protocol (ARP) • Static Routing Multicasting: • Multicast Addresses • Mapping IP addresses to MAC addresses • IGMP TCP and UDP: • Datagrams • Ports Applications: • SNTP • IEEE1588 Precision Time Protocol • DHCP with Option 82 • SNMP Network Requirements of Industrial Protocols: • ProfiNet • EtherNet/IP • Modbus/TCP Security: • 802.1x • RADIUS • Network Address Translation • Port Forwarding • Access Control Lists	Routing: • Routers and their functionality • IP addressing Unicast Routing Protocols: • RIP • OSPF Router Redundancy: • VRRP Multicast routing protocols: • DVMRP • PIM-DM • PIM-SM
Duration	3 Days	2 Days
Certification	Recommended for the Hirschmann™ Industrial Network Professional certification examination.	Recommended for the Hirschmann™ Industrial Routing Professional certification examination.

Training Courses

	Rail Family – Theory and Practice (CP1)
Objective	In a professional environment the participants receive in-depth knowledge about the OpenRail, OpenMICE, MACH, and OCTOPUS Layer 2 functionality. This includes installation, commissioning, and supervision. The training is part theory and part practice. The necessary knowledge about functions and deployment possibilities of the products are taught in individual theory blocks. Each block is followed by practical exercises, designed to familiarize the participants with the devices through first hand experience.
Prerequisites	An understanding of Ethernet, for example “Industrial Ethernet” (CT1) and “Industrial Networking” (CT2) is required.
Seminar Content	Introduction: • Overview of Hirschmann™ products • The Platform Concept Device Properties: • Form factor • Temperature ranges • Power supplies • Certifications Basic Settings: • Firmware management • Configuration management Switching: • Port configuration • Multicast control • VLANs Redundancy: • HIPER Ring • MRP • Subrings • Rapid Spanning Tree • Multiple Spanning Tree • Link Aggregation Diagnostics: • Port Mirroring • Device status • Topology Discovery • Configuration check • Event log Security: • Port Security • Authentication (802.1x) Advanced: • DHCP Relay and Server • Command Line Interface
Duration	3 Days
Certification	Recommended for the Hirschmann™ Industrial Rail Specialist certification examination.

	Industrial Backbone Components – Theory and Practice (CP3)	Network Management with Industrial HiVision (CP2)
Objective	In a professional environment the participants receive in-depth knowledge about the MACH and PowerMICE Layer 3 functionality. This includes installation, commissioning, and supervision. The training is part theory and part practice. The necessary knowledge about functions and deployment possibilities of the products are taught in individual theory blocks. Each block is followed by practical exercises, designed to familiarize the participants with the devices through first hand experience.	The participants learn the functions of Industrial HiVision, and reinforce this knowledge with practical exercises. Following this two-day course, the participants can make effective use of Industrial HiVision to supervise and configure any size of Ethernet network.
Prerequisites	A basic understanding of Ethernet and routing is required, for example “Industrial Ethernet” (CT1), “Industrial Networking” (CT2) and “Industrial Routing” (CT3). Product knowledge from the “Rail Family” (CP1) course is also recommended.	Basic knowledge of Ethernet is required, ideally together with product experience from the “Rail Family” (CP1) course.
Seminar Content	Hardware Overview: • MACH Family • PowerMICE Firmware Segmentation: • Layer 3 Enhanced • Layer 3 Professional Router Interfaces: • Port based • VLAN based Unicast Routing: • Static routing • RIP • OSPF • VRRP • HiVRRP • Tracking objects Multicast Routing: • DVMRP • PIM-DM • PIM-SM Access Control Lists (ACL): • Filer rules • Queue assignment QoS: • Weighted Fair Queuing • Traffic shaping	Installation: • Structure of Industrial HiVision • Client/Server Installation, Software Components • Industrial HiVision Service • SNMP Trap Service • Demo Network Commissioning: • Graphical User Interface (GUI) • Discovering Devices, Device Access • SNMP Configurations, Licensing Display Topology and Devices: • Map, Device and Properties view • Folder Structure, Auto topology • Properties of connections • Device Appearance, Object properties Device Configuration: • User-defined actions • MultiConfig™ Diagnostics and Logging: • Status configuration, Utilization • Logging in database and external file • Trap Destination • Event actions Documentation: • Device Documentation • Reporting and Handling Projects Remote Access: • Program Access, Web Access • Remote GUI • ActiveX control • OPC server Integration of Third-party Devices: • User-defined Properties
Duration	3 Days	2 Days
Certification	Recommended for the Hirschmann™ Industrial Backbone Specialist certification examination.	Recommended for the Hirschmann™ Industrial Product Professional certification examination.

Training Courses

	Wireless LAN Basic Application Principles (WLA)
Objective	Participants acquire familiarity with the underlying technology of wireless networks and their specific requirements as to range, EMC and security. They are also given an overview of the current state of WLAN technology.
Prerequisites	You will need basic knowledge of network technology.
Seminar Content	General overview: • Market significance of wireless LANs (WLAN) • Areas of application • Advantages and disadvantages Wireless LAN – the basics: • Physical layer/MAC • Transmission technology • Access methods • How it works • Packet formats The IEEE 802.11 standard: • Development history • Contents • Working groups Statutes and regulations: • Frequency bands • Communications systems Security: • Encryption using WEP, WPA and WPA2 • Weaknesses • Countermeasures Electromagnetic compatibility Planning a WLAN
Duration	2 Days
Certification	Recommended for certification as Hirschmann™ Industrial WLAN Professional

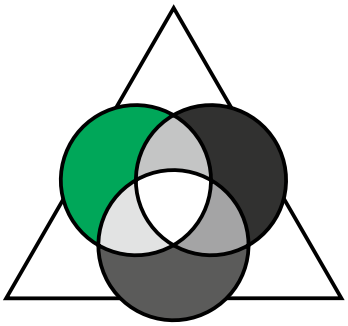
	Wireless LAN with BAT Family Workshop (WSWB)	Wireless LAN with BAT Family Advanced Workshop (WSWA)
Objective	In a professional environment the participants receive in-depth knowledge about the functionality of the Hirschmann™ BAT family. This includes installation, commissioning, and supervision as an Access Point, Client, or bridge. The training is part theory and part practice. The necessary knowledge about functions and deployment possibilities of the products are taught in individual theory blocks. Each block is followed by practical exercises, designed to familiarize the participants with the devices through first hand experience.	In this workshop the participants learn the extended functionality with an emphasis on how to configure secure access to a network via WLAN. The objective is the successful deployment of complex wireless networks with the possibility to use a Wireless LAN Controller. The training is part theory and part practice. The necessary knowledge about functions and deployment possibilities of the BAT54-Rail are taught in individual theory blocks. Each block is followed by practical exercises, designed to familiarize the participants with the devices through first hand experience.
Prerequisites	You will need basic knowledge in the field of wireless LAN, e.g. from the seminar “Wireless LAN – Basic Application Principles” (WLA).	Basic knowledge of Wireless LAN and routing is required. Prior attendance of the “Wireless LAN With BAT54-Rail Workshop” (WSWB) is recommended.
Seminar Content	Functionality of The BAT Family: • Product specifications • Radio module properties • WLAN settings • LAN settings • Hardware description • Environmental properties • Redundancy • Bandwidth scaling • Security Configuration: • Installation • Configuration with LANConfig • Wireless interface configuration • Connection status • Security configuration • Wireless Distribution System • Roaming • Web management and CLI • SNMP settings	Wireless LAN Controller: • Configuration • Supervision Routing: • Point to point • Internet access • RIP VLANs: • Redundant connections • Channel bundling • Hotspot functionality Firewalls: • Stateful Inspection • Access rules • Intrusion Detection RADIUS: • Local and Remote Virtual Private Networks (VPN)
Duration	2 Days	1 Day
Certification	Recommended for the Hirschmann™ Industrial Wireless Professional certification examination.	Recommended for the Hirschmann™ Industrial Wireless Professional certification examination.

Training Courses

	Network Security with EAGLE Workshop (WSS)
Objective	In a professional environment the participants receive in-depth knowledge about the EAGLE and its security functionality. This includes installation, commissioning, and supervision. The training is part theory and part practice. The necessary knowledge about functions and deployment possibilities of the EAGLE are taught in individual theory blocks. Each block is followed by practical exercises, designed to familiarize the participants with the devices through first hand experience.
Prerequisites	Basic knowledge of Ethernet, switching, and routing are required.
Seminar Content	Basic Settings: • HiDiscovery • Operating Modes • Static Routing • Firmware management, Configuration management • Port configuration • Time Synchronization Security: • SNMP, Web, SSH access • User Firewall Network Security: • Filtering IP Packets • Filtering MAC Packets • Firewall Learning Mode • Address templates • NAT (1:1) • IP masquerading (1:N) • Port Forwarding • Denial of Service Virtual Private Networks (VPN): • Authentication • IKE settings • IPsec settings, IP Networks • Address Mapping Redundancy: • Transparent Redundancy • Router Redundancy Diagnostics: • Events, Syslog • Port statistics • Topology Discovery • Device Status • Firewall Lists • Configuration Check Advanced: • DNS Server, Dynamic DNS • Packet forwarding • DHCP Relay and Server
Duration	3 Days
Certification	Recommended for the Hirschmann™ Industrial Security Professional certification examination.

	Your Individual Training Program
Objective	Customized training from Hirschmann™ offers you a multitude of benefits. Our experienced trainers can recognize and fill all your employees' knowledge gaps. This ensures maximum efficiency – and guarantees you an immediate return on your training investment. The Hirschmann™ Competence Center will be pleased to prepare an individual training program for you.
Prerequisites	None: the training contents are customized to the specific knowledge requirements of the participants.
Seminar Content	Please tell us what you specifically need from our current training program.
Duration	By individual arrangement

Consulting



Leverage our Experience

Whether it is network designing or network optimization – the result is what counts. We make sure our solution matches your ideas and your processes. Through the provision of customized services, we are with you from the initial consultation to the final system.

At every point in the process you receive exactly the amount of support you require. It makes sense to include Hirschmann™ in your plans right from the beginning. Good advice is only expensive when it comes too late.

Consultation

Which network technology best suits your applications? Which communications media and products? We assist you during system appraisals and technology selection, prepare migration concepts, and advise you on the suitable deployment of management tools. An emphasis is also placed on the optimum network security solution.

Design

Correctly designing or optimizing a network is more than just a question of technology. In addition to on-site network design, either cabled or wireless, we prepare an individual program for employee training and system maintenance. Right from the beginning you have comprehensive information about all stages of the process, presented in the way you want it.

Project Management

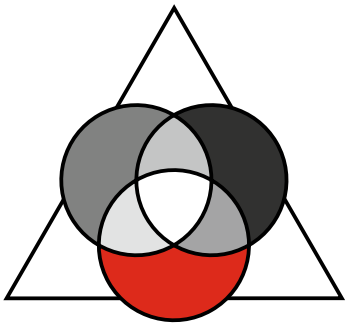
Together with our regional partners we also provide specialized support during the implementation of your network projects. In the Hirschmann™ test laboratory we can verify the compatibility of system components you have chosen. Critical functions can be simulated in a test environment.

At the commissioning stage we will provide you with complete technical documentation, as well as product familiarization for your employees.

Support

On Demand and in Demand

Time is money. A lot of money, when a network is out of service. Therefore our internal and external support specialists make sure that from day one your system is functioning perfectly – and stays that way. Through long-term technical advice and if necessary, through short-term troubleshooting. Ask us about our services.



Commissioning

The Hirschmann™ Support Team is at your disposal at any time for professional installation and configuration of your equipment. We will support you and your employees during on-site commissioning – or undertake the complete installation. All Hirschmann™ components can of course be delivered pre-configured by us. Reliability right from the start – directly from the manufacturer.

Help Desk

To bring your network back into operation again with the minimum of delay, contact our central Support Desk via the Hirschmann™ Service Hotline. Our experts are waiting for your call: for technical questions and problems, or if you need a replacement device. Subject to contract, direct problem diagnosis and rectification is available from our Help Desk around the clock.

Maintenance

Mission critical networks cannot afford downtime. We can help you to maximize the availability and lifetime of your network. We can design a maintenance concept tailored exactly to your needs, and if required can implement the concept in cooperation with our specially trained and certified partners.

This is where the network services cycle closes. Inevitably the time will come when it is once more necessary to optimize your network. No problem, when you can rely on the unparalleled consulting competence from Hirschmann™.

Always the Right Solution

Belden is the world's leading supplier of signal transmission solutions including cables, connectivity and active components for mission-critical applications ranging from industrial automation and alternative power generation through to professional broadcasting. Belden offers an extensive portfolio of highly specialized products for management, control and field level, which the company produces and markets under its proprietary Belden®, Hirschmann™ and Lumberg Automation™ brands. We would be glad to give you a more personal introduction to our integrated product palette for industrial applications and the worldwide Belden Service.

You will find further information and technical details online at www.beldensolutions.com. Or contact our Sales Team directly.

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