

***Certified PROFIBUS System Designer
Course
CPSD***

***Course Document
for PROFIBUS***

Version 1.0 – Date: July 2015

Order No.: 4.742

File name: LO-CPSD_4742_V10_Jul15

Prepared by PI Staff Unit SU4 "QS PI Training Center (PITC)".

The attention of adopters is directed to the possibility that compliance with or adoption of PI (PROFIBUS&PROFINET International) specifications may require use of an invention covered by patent rights. PI shall not be responsible for identifying patents for which a license may be required by any PI specification, or for conducting legal inquiries into the legal validity or scope of those patents that are brought to its attention. PI specifications are prospective and advisory only. Prospective users are responsible for protecting themselves against liability for infringement of patents.

NOTICE:

The information contained in this document is subject to change without notice. The material in this document details a PI specification in accordance with the license and notices set forth on this page. This document does not represent a commitment to implement any portion of this specification in any company's products.

WHILE THE INFORMATION IN THIS PUBLICATION IS BELIEVED TO BE ACCURATE, PI MAKES NO WARRANTY OF ANY KIND, EXPRESS OR IMPLIED, WITH REGARD TO THIS MATERIAL INCLUDING, BUT NOT LIMITED TO ANY WARRANTY OF TITLE OR OWNERSHIP, IMPLIED WARRANTY OF MERCHANTABILITY OR WARRANTY OF FITNESS FOR PARTICULAR PURPOSE OR USE.

In no event shall PI be liable for errors contained herein or for indirect, incidental, special, consequential, reliance or cover damages, including loss of profits, revenue, data or use, incurred by any user or any third party. Compliance with this specification does not absolve manufacturers of PROFIBUS or PROFINET equipment, from the requirements of safety and regulatory agencies (TÜV, IFA, UL, CSA, etc.).

PI®, PROFIBUS® and PROFINET® logos are registered trade marks. The use is restricted to members of PROFIBUS&PROFINET International. More detailed terms for the use can be found on the web page www.profibus.com/download.

Publisher:
PROFIBUS Nutzerorganisation e.V.
PROFIBUS & PROFINET International (PI)
Haid-und-Neu-Str. 7
76131 Karlsruhe
Germany
Phone : +49 721 / 96 58 590
Fax: +49 721 / 96 58 589
E-mail: info@profibus.com
Web site: www.profinet.com

© No part of this publication may be reproduced or utilized in any form or by any means, electronic or mechanical, including photocopying and microfilm, without permission in writing from the publisher.

PROFIBUS Learning Outcomes, Order No: 4.742

Course Title:	Certified PROFIBUS System Design
Course Code:	CPSD
Course Duration:	2½ days (including 1½ hour theoretical examination)
Grading Type:	Normal
Credits:	Subject to approval
Prerequisites:	- Certified PROFIBUS Installer Course or equivalent - Industrial Automation Background

Version 1.0
26 July 2015

This Learning Outcome is one of a series of several courses:

4.712 Certified PROFIBUS Engineer
4.722 Certified PROFIBUS Installer
4.732 Certified PROFIBUS-PA Engineer
4.812 Certified PROFINET Engineer
4.822 Certified PROFINET Installer

1 Aims & Objectives

It is widely accepted that many of the basic layout errors that are found in networked systems are made at the design stage. The Certified PROFIBUS System Design course has been developed to provide specific training for managers, designers and engineers who are involved in the planning, specification, design and procurement of PROFIBUS systems.

A wide range of training is available for PROFIBUS and PROFINET technology and applications. The certified courses that have been developed by PI cover various application areas and user requirements, for example installation, engineering, design etc. These PI certified courses have the advantage that the learning outcomes are well defined, giving international standardisation to the qualification. The course examinations are also checked to ensure that they cover these learning outcomes and that the successful candidate has demonstrated a good level of knowledge, skill and understanding in the required areas.

- a) The Certified PROFIBUS Installer course (document 4.722) provides a basic introduction to PROFIBUS technology and covers the rules and good practice for successful system layout and installation. The Installer training was developed for those people involved in installation, but it also provides an essential basic introduction for those involved with the specification and design of PROFIBUS systems.
- b) The Certified PROFIBUS System Design course (this document) covers the design of PROFIBUS networks for both factory automation (DP) and process automation (PA) applications. It also covers the use and integration of other technologies such as PROFINET, Ethernet TCP/IP, HART, AS i, IO Link, OPC and FDT/DTM etc. However, the course is firmly centred on PROFIBUS and does not deal with these other technologies in depth.
- c) The Certified PROFIBUS Engineer courses (documents 4.712 and 4.732) are in depth courses which provide advanced training for Engineers involved with PROFIBUS networks. There is some overlap between the Design course and these PROFIBUS Engineer courses. However, the overlap is not significant and the emphasis is generally different.

The Certified PROFIBUS System Design course assumes a basic familiarity with the rules for PROFIBUS network layout and installation. The designer must also understand the causes of reflections and pick up and how these can be avoided on PROFIBUS systems. For this reason the Certified PROFIBUS Installer course, or an equivalent course, is recommended as a prerequisite for the Certified PROFIBUS System Design course.

The certified PROFIBUS System Design course assumes a familiarity with the learning outcomes of the Certified PROFIBUS Installer course and builds on this foundation with significant additional knowledge and techniques. The Certified PROFIBUS System Design course covers the design of PROFIBUS networks for both factory automation and process automation applications.

The Certified PROFIBUS System Design course is a hardware orientated course which is concerned with the specification, selection, layout and configuration of parts to make a system with optimum performance, maintainability and availability. The course aims to give the system designer in depth knowledge of the important considerations and techniques for designing cost effective and robust PROFIBUS networks. Network maintenance and health-checking are central to this concept as is the effect of layout on the impact of faults that may develop in terms of the frequency, extent and duration of failures that will inevitably occur during the lifetime of the plant.

The course aims to show how to avoid common design mistakes through informed and systematic system design and to produce optimum but flexible solutions for a range of applications and industries. The Certified PROFIBUS System Design course has less hands-on content than the other certified courses. However, the material covered reflects the practical methods used to design real systems. Practical examples and case study material feature heavily in this course.

The Certified PROFIBUS system design course includes an appreciation of functional safety systems. However, this is not a specialised safety system design course and in no way provides a substitute for proper safety system training. Similarly, the course covers design requirements for intrinsically safe systems for operation in hazardous environments, but is not a substitute for proper Dangerous Substances and Explosive Atmospheres Regulations (DSEAR) training. The Certified PROFIBUS System Design course will make the designer aware of the requirements for functional safety systems and hazardous environments and the additional training that might be required.

2 Learning Outcomes

The following learning outcomes specify what candidates will know or be able to do as a result of successfully completing the course. These learning outcomes are developed during the course and assessed during the theory test.

On successful completion of this course candidates will be able to:	
1.	General system design requirements
1.1	Understand the automation/control system life cycle and understand the importance of planning for future needs. Appreciate the need to consider system maintenance, health checking and fault finding during design.
1.2	Describe the relative characteristics and benefits of various communication technologies for different applications (PROFIBUS DP, PA, PROFINET, HART, Ethernet TCP/IP, AS-i and IO-Link). Make informed choices of appropriate technologies and equipment. Understand how different solutions can be integrated to provide a cost effective and maintainable design.
1.3	Understand the function and applications of supervisory technologies including OPC, FDT/DTM and EDD. Understand the concept of Field Device Integration(FDI) technology for Configuration, Operation, diagnostics and calibration of field devices and its relationship to OPC. Choose appropriate solutions for the integration of operation, supervision and engineering information into the control system.

1.4	Evaluate the environmental conditions that apply to automation system components. Understand and specify IP rating codes for equipment and connectors. Understand and specify various cable types and sheath materials for use in various environments.
2.	PROFIBUS network layout and design
2.1	Evaluate various network architectures in terms of cost, maintenance and downtime impact when devices, cables or connectors fail.
2.2	Understand the importance and impact of segmentation on the failure of networks. Apply the concept of division of the control system into separate automation areas or islands that can be isolated, shut down and maintained separately from the rest of the plant.
2.3	Specify and select gateway devices for connection to other protocols and communication networks.
2.4	Understand how PROFIBUS diagnostics can be used to report peripheral errors as well as communications errors. Select devices that incorporate suitable diagnostics for an application.
2.5	Understand the fail safe operation that is inherent in PROFIBUS devices. Design remote IO circuitry to use the fail safe features appropriately for sensors and actuators.
2.6	Understand the importance of proper grounding of equipment. Functional and clean earth requirements. Potential equalisation and bonding systems. Specification and design of grounding systems.
2.7	Choose solutions that protect from interference pickup and special environmental conditions. Design solutions that protect against possible lightning strike and surge currents.
3.	PROFIBUS profiles
3.1	Understand what a profile is and how it can simplify system design and maintenance and provide vendor independence. Know which profiles are important for various industries and application areas (ProfiDrive, ProfiSafe, the PA profile, ProfiEnergy etc.).
3.2	Understand How the PA profile organises the process value and status in cyclic data exchange and how parameters can be acyclically accessed using generic engineering tools.
3.3	Understand the concept and advantages of automatic ID number selection. Appreciate the advantages of using "profile" GSD files and DTM/EDD files as opposed to manufacturer specific files and how these can make configuration and engineering tools independent of the manufacturer.
4.	Hazardous areas
4.1	Understand the essential requirements for hazardous areas and evaluate different design options that are available, for example entity methods, FISCO, high energy trunk, fieldbus barriers etc.
4.2	Calculate segment loading and voltage drop limits for an intrinsically safe MBP segment. Apply the FISCO rules to the design of MPB segments.
4.3	Understand the requirements and available solutions for intrinsically safe RS485 segments.

5.	High availability systems and redundancy
5.1	Understand terminology of component and system reliability and the basic methods for improving availability.
5.2	Select and apply redundant solutions for PROFIBUS systems, including redundant masters, redundant slaves and media redundancy.
5.3	Understand the various causes of common cause failures such as power supply failure, interference pickup, cable routing and mechanical or process failures on redundant systems.
5.4	Apply basic reliability modelling techniques for series and parallel reliability calculations. Calculate the reliability and expected downtime for a range of system architectures. Understand the problem of common-cause failures and how these impact on the reliability model.
5.5	Evaluate available solutions for high availability PROFIBUS systems. Understand the limitations that apply and the essential need for monitoring, diagnostics and rapid repair in such systems.
6.	Fibre optic, infra-red and wireless transmission
6.1	Understand the basics of fibre optic transmission and the various types of fibre that are available. Know the terminology that is used with fibre optic media and devices.
6.2	Choose appropriate types of fibre, optical links, and connectors for an application. Appreciate the importance of correct cable fabrication, testing and attenuation measurement.
6.3	Calculate the expected attenuation of a fibre optic cable and connectors. Determine the power budget for a typical application.
6.4	Use single and dual channel Optical link modules in the design of various topologies.
6.5	Specify and design redundant fibre optic segments.
6.6	Understand that fibre optic segments can have an impact on bus timing parameters.
6.7	Understand the basics of infra-red communication. Choose appropriate devices for a range of applications.
6.8	Understand the effects of misalignment and vibration on the operation of infra-red links.
6.9	Understand the basics of wireless communication. Choose appropriate devices for a range of applications.
6.10	Understand the importance of a site survey when designing a wireless link.
7.	Safety related systems
7.1	Understand the basic requirements for functional safety in process automation and in factory automation applications.
7.2	Definition of the basic terminology used in safety related systems including: Safety Instrumented Function, Safety Instrumented System and Safety Integrity Level, dangerous and safe failures etc.
7.3	Understand the importance of the SIL level and the factors that influence its choice and achievement.
7.4	Understand the ProfiSafe profile and how this can be used to achieve the required target SIL level.
7.5	Understand the importance of the maximum response time in safety related systems and the factors that influence its choice and achievement.

8.	Control system and network timing
8.1	Understand the need for deterministic sampling and timing in control systems. Understand the basic terminology used in describing system timing performance, for example controller scan time, bus cycle time, sample time and jitter.
8.2	Evaluate the effect of sampling too slowly and too rapidly on logical and quantitative control systems. Understand the effects of sample time and jitter time on control system performance. Evaluate the impact of the bus cycle time on jitter for a typical application.
8.3	Understand that the network bit rate should be selected fast enough to achieve the required performance and that higher speeds can reduce system robustness and reliability.
8.4	Estimate the expected cycle time and jitter of PROFIBUS DP and PA networks. Calculate the required bus speed to achieve a given cycle time.
8.5	Understand the effect of gateways, sub-networks and DP-PA couplers and link modules on control system timing.
8.6	Understand the characteristics and applications of isochronous cycle time and how this can reduce jitter in high speed control systems.
9.	Network validation and acceptance procedures
9.1	Understand the documentation that is required for the specification, design, installation and validation of the control system. List the documentary references to be used.
9.2	Understand the importance of network acceptance procedures and that these should be formulated at the specification/design stage. Understand the function of factory acceptance tests and plant acceptance tests.
9.3	Review all documentation created and check contents.
9.4	Know what points must be checked to perform a visual inspection, to check conformance with installation standards. Know what to compare in a planned vs. real installation.
9.5	Know what points must be checked and which tools are used to perform an electrical analysis on PROFIBUS signals.
9.6	Know what points must be checked and which tools are used to perform a statistical analysis on PROFIBUS frames.
10.	Modern solutions for network monitoring
10.1	Appreciate the benefits of permanent network monitoring.
10.2	Design a practical network monitoring system for DP and PA segments.
11.	Network documentation and drawing standards
11.1	Understand the basic uses for network documentation and drawings in installation, commissioning and maintenance.
11.2	Understand how the customer requirements, functional design specification, factory test and plant test procedures are used in the design process.
11.3	Create appropriate and useful network documentation and drawings.

3 Instructors

This course relies heavily on the experience and expertise of the instructor(s). Therefore the instructors should have a wide range of experience in the application of PROFIBUS to a variety of industries and plant including factory automation and process control.

The instructor(s) must have passed the Certified PROFIBUS System Design course and the Certified PROFIBUS Engineer course as a minimum and must be registered with PI.

4 Training and assessment methods

The training covers the appropriate design of both factory automation and process automation systems. The training should cover the topics listed in the syllabus below and must cover the required learning outcomes. The delivery may be customised and formatted to suit the knowledge and experience of the instructor and the needs of the candidates. However, the training must cover the appropriate use of both DP and PA devices and RS485 and MBP segments even when the course is delivered to trainees that require only information relevant to factory automation or process automation.

The Certified PROFIBUS System Design course training can be delivered in a variety of ways, for example, distance learning, use of design tools (design packages, spreadsheet tools etc.) However, it is essential that the learning outcomes are fully covered and that the final examination tests the candidate's knowledge and understanding of these outcomes to the required standard and depth.

The training must include examples and case studies from real installations. Examples of poorly designed installations can also be used to illustrate the material and to provide practice in applying the techniques learned.

It is recommended that a short (1½ hour) tutorial session is included in which revision/practice questions are answered and checked with the aid of the instructor. The tutorial questions should generally be open-ended to promote discussion and expose any weaknesses or misunderstandings the candidate(s) may have.

5 Syllabus

5.1 General system design requirements

[2 hour]

- ☐ The automation/control system life cycle. Planning for future requirements, expansion and changing needs. The importance of considering maintenance, health checking and fault finding features at the design stage.
- ☐ Relative characteristics and benefits of various communication technologies for different applications (i.e. PROFIBUS DP, PROFIBUS PA, PROFINET, Ethernet TCP/IP, IO-Link, HART and AS-i. Copper, fibre optic, infra-red and wireless technologies). Methods for integration of different communication standards to provide a cost effective and maintainable system.

- ☐ Application and positioning of supervisory technologies such as OPC, FDT/DTM, EDD and FDI. How these impact on configuration, operation, diagnostics and calibration. Relationships between these various technologies.
- ☐ Automation system environmental conditions. Choice of appropriate connection technologies and components. Solutions for equipment mounted in wet/corrosive environments, extreme temperatures, hazardous environments (explosion or fire risk), susceptibility to lightning strikes rodent damage etc.
- ☐ Ingress protection and IP codes for equipment and connectors.
- ☐ Cable sheath types and suitability for use in various environments.

5.2 PROFIBUS network layout and design [2 hour]

- ☐ Examples of various PROFIBUS network architectures and their relative advantages in terms of costs, maintenance and downtime. Comparison of the performance and advantages of various solutions and architectures using DP, PA and other technologies. The advantages of integrated PROFIBUS devices over dumb devices connected to PROFIBUS via remote IO. The use of distributed control, multi-master controllers, multi-segment layouts etc. Examples that allow live replacement, e.g. correct use of active terminators, short spur lines to slave devices (low speed DP and PA only). Appropriate use of segmentation including hubs. Dealing with live device and module replacement (e.g. the DPV1 Check_Cfg_Mode parameter flag).
- ☐ Overview of solutions for providing operator, supervisor and engineering information. Open technologies that provide access to the control system for these people. In particular OPC, FDT/DTM, EDDL, FDI etc. and how these can provide manufacturer independent access for use within SCADA and management systems and engineering tools.
- ☐ Characteristics and selection of PROFIBUS gateways to other protocols, e.g. Ethernet TC/IP, PROFINET, HART, AS-i and IO-Link.
- ☐ PROFIBUS diagnostics organisation. The use of extended diagnostics to report peripheral errors. Example devices that incorporate peripheral diagnostics and how these can be used in an application.
- ☐ PROFIBUS fail safe operation. Example failsafe devices with user settable failed state. Design of remote IO circuitry to use the fail safe features appropriately.
- ☐ Methods for protection against lightning strike (surge protection and use of fibre optic segmentation).

5.3 PROFIBUS profiles [1½ hour]

- ☐ Overview of PROFIBUS profiles. How profiles can simplify system design and maintenance and provide vendor independence. Applications of various profiles (ProfiDrive, ProfiSafe, the PA profile, ProfiEnergy etc)
- ☐ The PA profile. Organisation of process value and status in cyclic data exchange. Condensed status and NE107 Implementation. Acyclic parameter access using generic engineering tools.
- ☐ The implications and relative merits of using "Profile" vs Manufacturer Specific GSD files and DTM/EDD files.

- ☐ Device exchange feature of PA profile 3.02 devices (automatic Ident. Number selection).

5.4 Hazardous areas [2 hour]

- ☐ Essential requirements for hazardous areas, zones (divisions) gas groups and temperature classifications. Overview of common protection methods (i.e. Ex ia, Ex ib, Ex d, Ex n etc.).
- ☐ Evaluation of available design options (i.e. Entity, FISCO, High power bus etc.).
- ☐ Segment loading and voltage drop calculation for intrinsically safe MBP segments.
- ☐ Application of the FISCO rules to the design of MBP segments.
- ☐ Essential requirements and available solutions for intrinsically safe RS485 segments.

5.5 High availability systems and redundancy [2 hour]

- ☐ Basics of component and system reliability. Definition and use terms such as reliability, availability, mean time between failure, mean time to repair, downtime etc.
- ☐ Application of basic reliability modelling techniques for series and parallel reliability calculation. Examples of duty/standby systems, and simple redundant systems. Reliability of one out of two (1oo2), 1oo3 and 2oo3 systems.
- ☐ Examples of common cause failures and their impact on system reliability. Minimising the effects of common cause failures.
- ☐ Overview and evaluation of practical solutions for high availability and high reliability PROFIBUS systems. Limitations of various systems and the essential need for monitoring, diagnostics and repair in such systems.

5.6 Fibre optic, infra-red and wireless transmission [1½ hour]

- ☐ Basics of fibre optic transmission. Plastic, multi-mode glass and mono-mode glass transmission. Standard connector types and their uses. The importance of correct cable fabrication and attenuation measurement.
- ☐ Calculation of attenuation and power budget for a range of applications.
- ☐ Use of single and dual channel Optical link modules. Design of various topologies including ring, star and tree structures. Solutions for redundant fibre optic systems.
- ☐ Examples of how bus parameters can be influenced when using fibre optic segments.
- ☐ Basics of infra-red communication. Examples of devices and mounting arrangements. The effects of misalignment and vibration on infra-red transmitters and receivers.
- ☐ Basics of wireless transmission. Examples of devices and mounting arrangements. The importance of a proper site survey and consideration of environmental conditions (i.e. other wireless devices, building construction and leaves on trees etc.).

5.7 Safety related systems [2 hour]

- ☐ Essential requirements and design options for safety related systems. Definition and use of such terms as Dangerous failure, mean time between failures, Safety Instrumented Function, Safety Instrumented System and Safety Integrity Level etc.
- ☐ The ProfiSafe profile and its application as part of a Safety Instrumented System. Achievable target SIL and constraints on the communication architecture
- ☐ Overview of requirements and practice of SIL calculation.
- ☐ Overview of methods for calculating of the maximum response time of a safety function.

5.8 Control system and network timing [1½ hour]

- ☐ The control system feedback loop, sampling and timing. Define the terms real-time, sample time and jitter.
- ☐ The effects of sampling too slowly and too rapidly on logical and quantitative control systems. The effects of controller scan time and bus cycle time on control system performance.
- ☐ Estimation of the expected cycle time and jitter of PROFIBUS DP and PA networks. Calculation of the required bus speed to achieve a given cycle time.
- ☐ The effect of gateways and couplers on control system timing.
- ☐ Basic characteristics and applications of isochronous cycle time and how this can reduce jitter in high speed control systems.

5.9 Network acceptance procedures [1 hour]

- ☐ Project documentation requirements for specification, design, installation and validation.
- ☐ Overview of available documentary references (e.g. standards, technical guidelines, check lists etc.)
- ☐ Points to be checked during a visual network inspection in order to conform to installation standards. Comparison of planned and real installation.
- ☐ Points to be checked for an electrical analysis on PROFIBUS signals. The importance of individual segment checking.
- ☐ Points to be checked to perform a statistical analysis on PROFIBUS frames (e.g. live list, retries, syncs, corrupted frames, diagnostic requests, cycle time measurements etc.)

5.10 Modern solutions for network monitoring [30 min]

- ☐ Available methods and benefits of permanent network monitoring.
- ☐ Layout of a network monitoring system.

5.11 Network documentation and drawing standards [1 hour]

- ☐ Basic types and uses of network documentation and drawings in installation, commissioning and maintenance.
- ☐ Use of customer requirements, functional design specifications, factory acceptance testing and plant acceptance testing.
- ☐ Standards for network documentation and drawings.

6 Training Equipment

No specific training equipment is required for this course. However, it will be of benefit to have examples of typical equipment to show. Trainees will require a simple calculator. Various PC based tools may also be used for calculation of bus loading, cycle times, MBP voltage drop etc. in which case a laptop computer will be required between each pair of trainees. However, this is not essential.

7 Assessment Scheme

The assessment is based on a single theory examination. A score of 70% is required to pass. The test is completely “open book”, that is the candidate can use the course notes, other reference material, calculator, PC software etc. freely during the test.

Theory Test: (1½ hour)

The exam questions are to be picked from a central database of questions. This database is set up and administered by PI. Each question in the database is given a percentage weight. Each PITS should select appropriate number of questions from each section to achieve the approximate breakdown given below.

General system design requirements	10%
PROFIBUS network layout and design.....	10%
PROFIBUS profiles:.....	10%
Hazardous areas	10%
High availability systems and redundancy	10%
Fibre optic, infra-red and wireless transmission.....	10%
Safety related systems	10%
Control system and network timing.....	10%
Network acceptance procedures	10%
Network monitoring.....	5%
Network documentation and drawing standards	5%

8 Text Books and references

1. PI order No: 8.012+42 (English)/8.011+41 (German) – PROFIBUS Installation Guideline for planning with supplement.
2. PI order No: 2.232 – ProfiSafe Environmental requirements.
3. IEC 61508, “Functional safety of electrical/electronic/programmable electronic safety-related systems”, all parts 1-7.
4. PI order No: 4.192 – On the road with the process fieldbus.
5. Max Felser – PROFIBUS Manual.
6. PI order No: 2.292 – Validation of PROFIBUS Systems.
7. www.iec.ch/functionalsafety/ - general web site for information about IEC safety standards, FAQs and updates.
8. Pepperl+Fuchs, “Safety Integrity Level Manual”, available at:
9. http://files.pepperl-fuchs.com/selector_files/navi/productInfo/doct/tdoct0713a_eng.pdf

10. Josef Borcsok: "Functional safety: basic principles of safety-related systems", Hüthig, 2007, ISBN 3778529862
11. David J. Smith, Kenneth Simpson, "Functional safety: A Straightforward Guide to Applying IEC 61508 (2010) and Related Standards", 3rd Edition, Elsevier, 2010, ISBN 0080967817

© Copyright by:

PROFIBUS Nutzerorganisation e. V. (PNO)
PROFIBUS & PROFINET International (PI)
Haid-und-Neu-Str. 7 • 76131 Karlsruhe • Germany
Phone +49 721 96 58 590 • Fax +49 721 96 58 589
E-mail info@profibus.com
www.profibus.com • www.profinet.com