

# Indu-Sol

## The IIT Network Equipment Supplier

Products



Diagnostics



Monitoring



Training



Consulting



NET



WORK

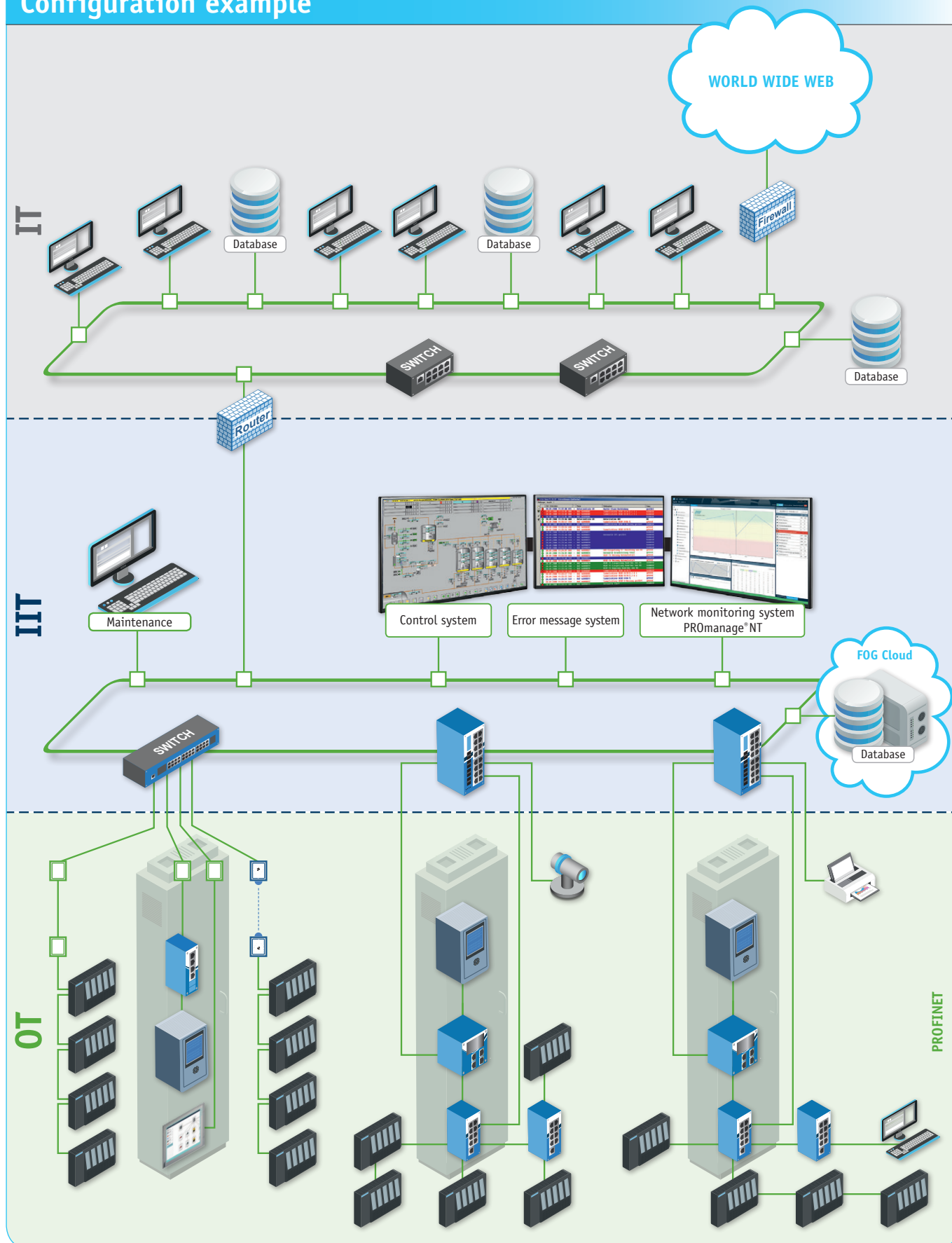


SUPPLIER



# Ethernet / PROFINET in the context of Industry 4.0

## Configuration example



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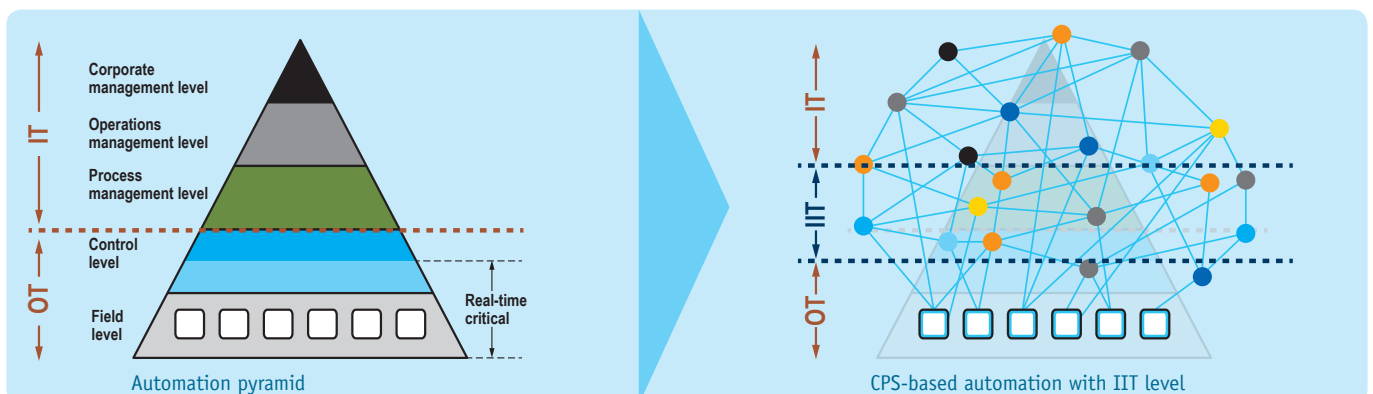


## Networked future – accepting the challenge



Ethernet-based real-time protocols are becoming the standard in industrial data communication. Classic fieldbus protocols hardly play a role anymore in new automation technology concepts. According to estimates, PROFINET achieved more market share than PROFIBUS for the first time in 2017. Advocates of this technology and its successors are already talking about a “triumphal march” of Ethernet in production control, because all of a sudden, communication paths

from machine control to the ERP system are much easier to implement. Typical performance limits are disappearing, and responsibilities are merging in the course of this development. This adds to the importance of clarifying responsibilities again, because networks are no longer the sole responsibility of the IT department.







## The tasks and responsibilities of the individual areas can be described as follows:

### Information Technology (IT) area:

Umbrella term for all processes in the company related to electronic data processing. IT is responsible for the control, processing, storage and backup of data, including the hardware and software used for this purpose. IT management deals with the control of IT processes in a broader sense in order to guarantee the processes in the company and to achieve targets.

### Industrial Information Technology (IIT) area:

Defines the link between the IT and OT areas. It is responsible for the acquisition and transfer from the OT area to IT of data that are not directly related to machine and system control, but are of decisive importance for process control and optimisation, e. g. quality monitoring/evaluation, logistics, and material flow.

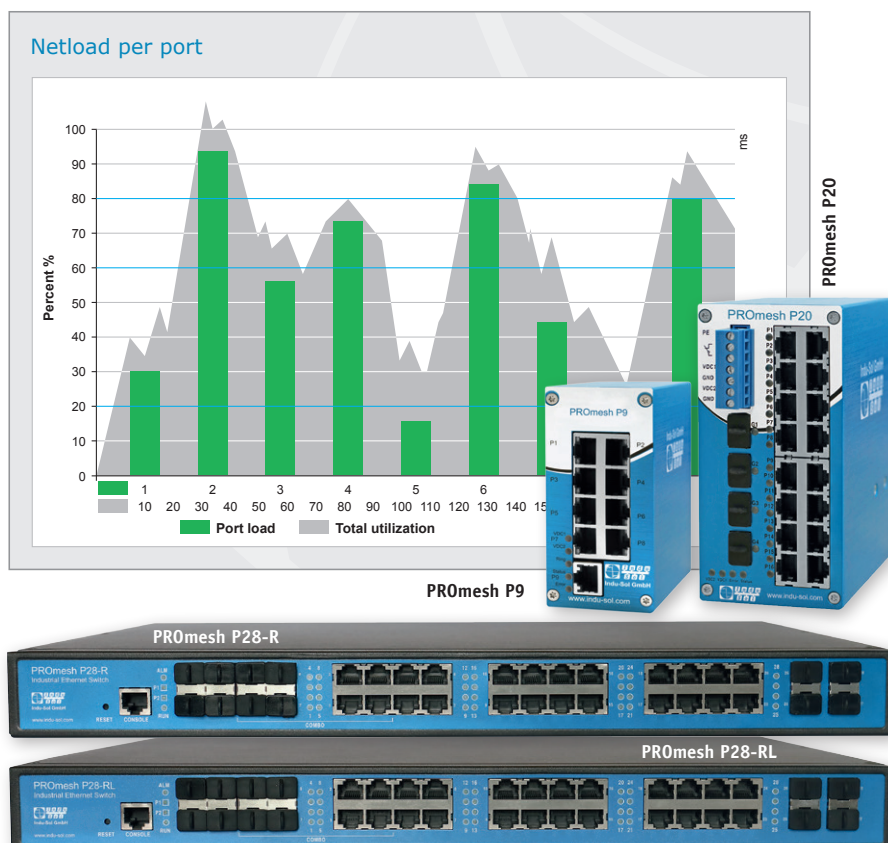
### Operational Technology (OT) area:

Operational Technology (OT) refers to hardware and software required for the control, regulation, monitoring and control of machines, systems and processes. In the past, operative technologies were only seen as industrial control systems, which communicate in closed systems with proprietary protocols. With the entry of Ethernet-based communication (real-time) into the OT area, an IT / OT convergence is developing which represents a new challenge.

While the protection and confidentiality of data are of paramount importance for information technology (IT), availability in production is the key factor for operational technology (OT). Ultimately, both areas must approach each other in order to work productively and efficiently in the age of the IoT – a challenge that must be faced together.

In order to face the changes with confidence and success, Indu-Sol has developed – in addition to the already existing diagnostic concept **PROmanage® NT** – the **switch family PROmesh**. In combination, they stand for highest availability and operational reliability in OT networks. The **switch family PROmesh**, the device development of the future, represents a new generation of its kind with its “High Performance onboard Diagnostic”. In addition to intelligent switch functionality, the **PROmesh P9/P20** has an integrated EMC monitoring function that can be used at any time to make a statement about the relationship between network status and EMC stability. The clear and intuitively interpretable web interface in the typical traffic light colours

enables everyone to react quickly and accurately to events in the network, and forms the basis for predictive, predictable maintenance.





## Network planning

When we speak of network planning in automation technology, this is usually limited to a machine or system. More correctly, however, the planning should be set up on a larger scale and the machine/system understood as a component of the overall network within a hall network. This provides a complete overview of the communication relationships between OT or IIT and IT at a very early stage, allowing responsibilities and access rights to be defined in advance.

In order to achieve an optimal and secure network structure, it is necessary to draw up a list of questions in advance and to define key points:

- New setup or expansion
- Speed – bandwidth
- Network topology
- Network configuration / network load
- Access rights / Security
- Infrastructure components – Server
- Transfer medium – Copper, glass, wireless
- Power supply EPS / UPS
- Network diagnostics and monitoring
- Responsibilities / Maintenance / Service

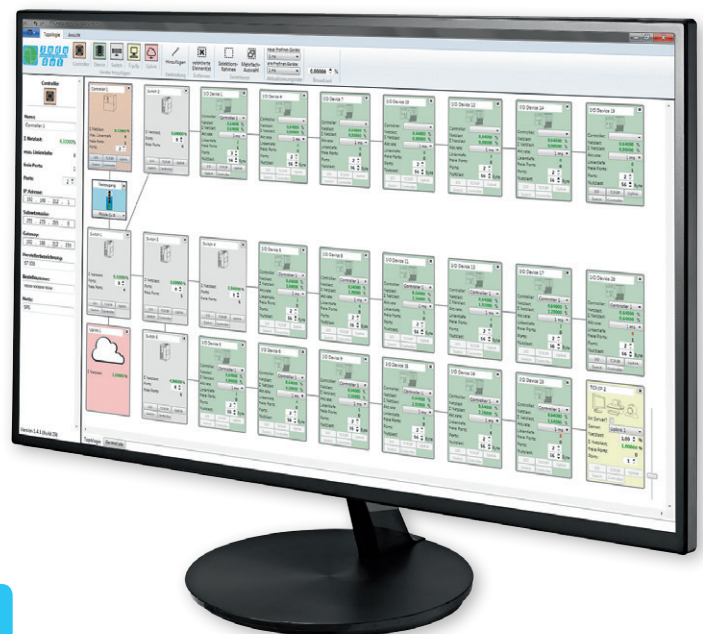
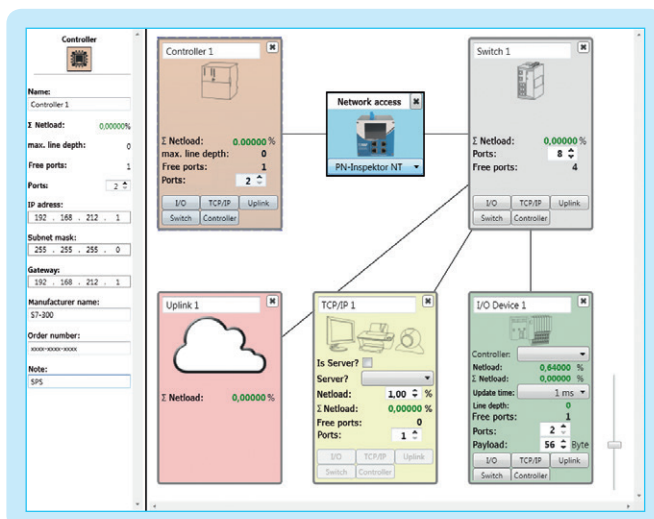


## Standards and guidelines

- PROFINET Planning Guidelines of PI  
Version 1.14 – December 2014
- PROFINET Commissioning Guideline of PI  
Version 1.36 – December 2014
- PROFINET Assembly Guideline of PI  
Version 1.0 – January 2009
- Functional Bonding and Shielding of  
PROFIBUS and PROFINET – Version 1.0 – March 18
- Cabling structure  
acc. to ISO/IEC 11801

## Interactive preliminary planning – PROnetplan

PROnetplan is a software for the preliminary planning of industrial networks. The network can be assembled in an intuitive way on a graphic interface, and be tested interactively. Important parameters like the netload at the controller are calculated and displayed automatically based on the line depth and the preset update rate. With a simple simulation of the communication parameters and changes in the network structure, potential bottlenecks can be identified and eliminated during the planning stage. All devices and the predicted netload for each interface are listed in a clear overview.



## Acceptance test and quality control

In the interest of a permanently high level of network availability, it is important to establish statements or requirements during the planning phase regarding qualitative evidence of the network function. In a technical delivery specification (user requirements specification), in addition to the infrastructure components, a measurement-based verification of the installation and the communication behaviour under load conditions must also be stipulated. The following tests and inspection steps are to be carried out.

### Offline analysis

#### Cable measurement

After completed installation at the final installation location, the cables of all Ethernet and PROFINET data cables must be measured end-to-end (PROFINET 2pr E2E).

The following values must be evaluated and logged depending on length: min. insertion attenuation reserve – loss along the length of the line – min. NEXT reserve – attenuation of the cross talk between the individual pairs of wires.

**Inspection tools: ETHERtest V5.2, Art. No. 112010012**

### Online analysis

Online analysis must be done while the system is functioning and the network is fully completed. It must be carried out by a company which is independent of the installer, and which has been approved by the client.

#### Operational reliance analysis:

The “Operational reliance analysis” should be carried out over a period of at least five working days with full/partial system functionality. The telegram traffic between the PLC and the first switch port is permanently logged in order to qualitatively evaluate the parameters listed here.

**Inspection tools: PROFINET-INSPEKTOR® NT,**  
**Art. No. 124030100**

#### System-describing analysis:

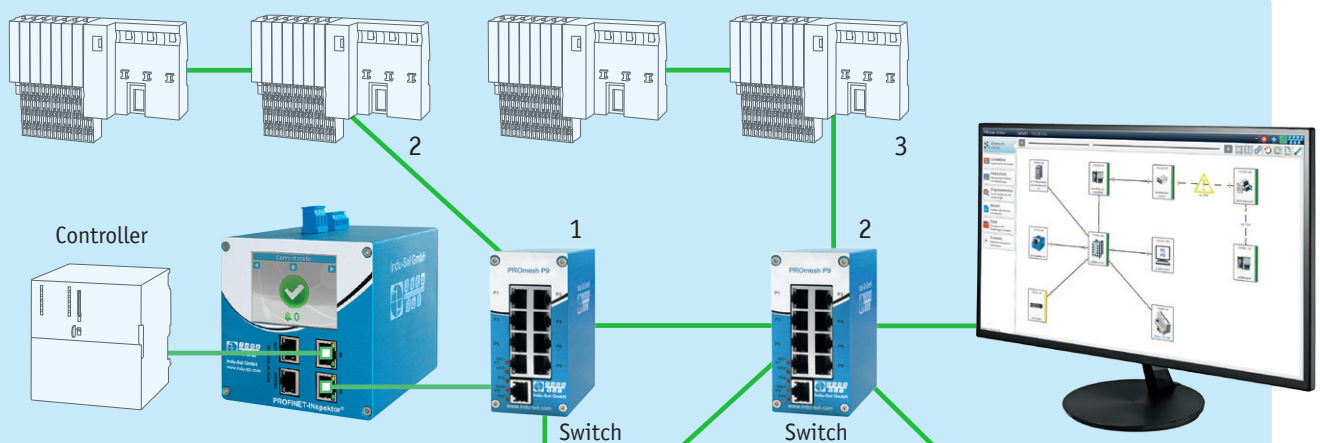
It is used to determine the topology of the network including all network and device information. These must be checked for compliance with the planning specifications and documented.

**Inspection tools: PROscan Active® V2,**  
**Art. No. 117000053**

### RECOMMENDATION – Quality values

Recommendations on the quality values in PROFINET by InduSol

<b>Jitter</b> (deviation from the planned update time)	≤ 50 %
<b>Telegram gap</b> (missing telegram)	0
<b>Error telegram</b> (defective telegrams)	0
<b>Load ratio</b> (How heavily the network is loaded?)	100 : 1
<b>Netload</b> (network load in 100 mbps)	< 20 %



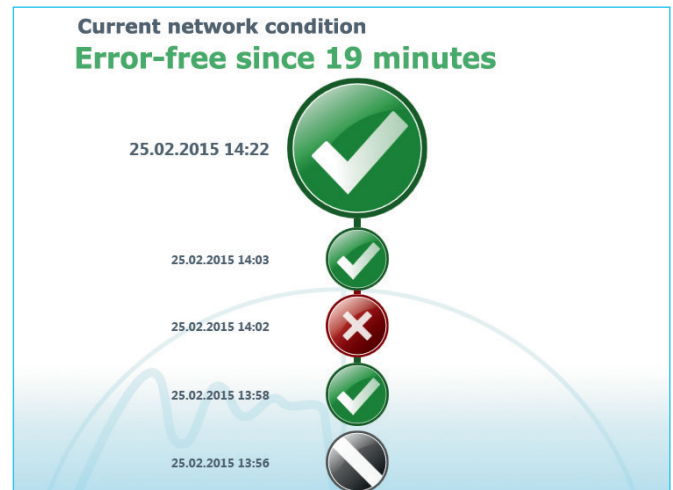
Integration of the PROFINET-INSPEKTOR® NT into the PROFINET network



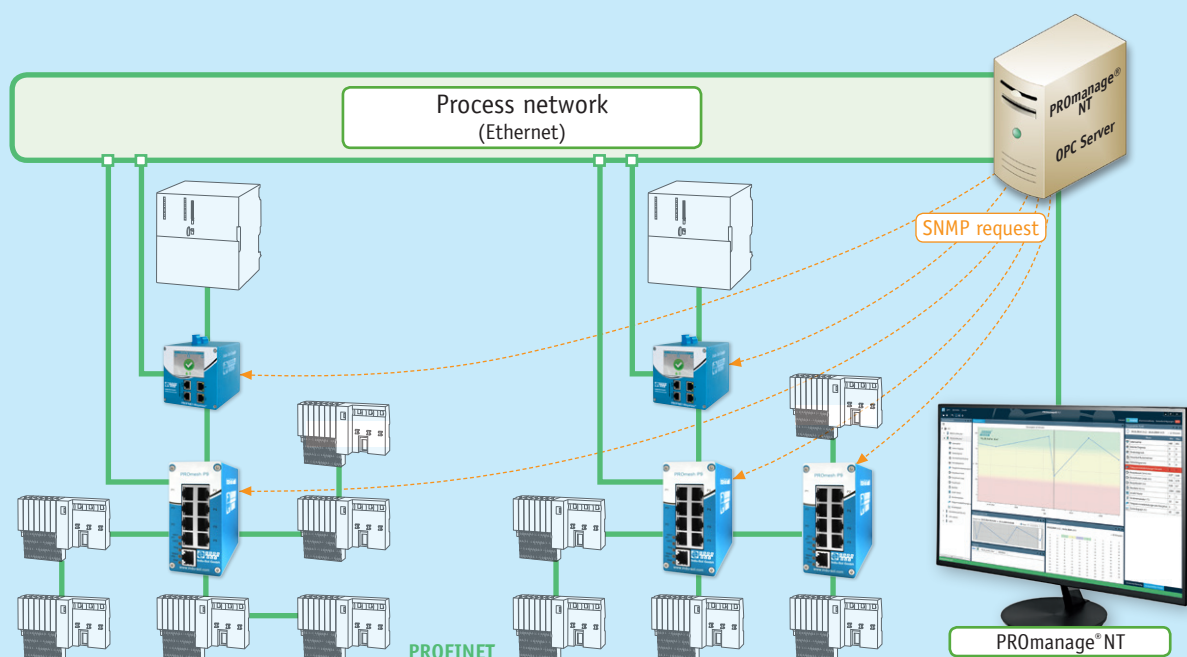
## Network monitoring

Network monitoring is an important component of end-to-end asset management. Often the question arises from which number of devices or for which network characteristics network monitoring should be adopted. In automation, however, the associated networks are often still regarded as small units isolated towards the outside, although the connections between them and to the high-level IT network are becoming more and more apparent. The question cannot be answered by looking at a single machine or system control, but can only be answered in the context of monitoring the entire OT network. A definite topology, traceable data transmission paths, and associated information such as netload, availability, speed, communication devices are basic prerequisites for assuming responsibility for a network.

Network monitoring is an automated maintenance and repair system that permanently determines the current network status and, in the event of quality-relevant events, issues a foresighted alarm with a specific time reference. To achieve this, the central monitoring software **PROmanage® NT** queries, analyzes, stores and graphically displays the device diagnoses, including port statistics, minute-by-minute via a standard SNMP protocol.



When using PROFINET, the passive **PROFINET-INspektor® NT** data loggers are additionally installed between the controller and the first switch port in order to obtain information about the communication behaviour within the network. This is necessary because the device diagnoses of the manufacturers allow very different or sometimes even no statements about the communication status of the network.



Integration of components for network monitoring



## Event notification with time stamp

With the integrated threshold value management, limit values can be defined for every network parameter. When a limit is reached, an entry with a time stamp and event description is made automatically in the event list. Information about network errors can be retrieved from the event list with just one click.

## Alarm management

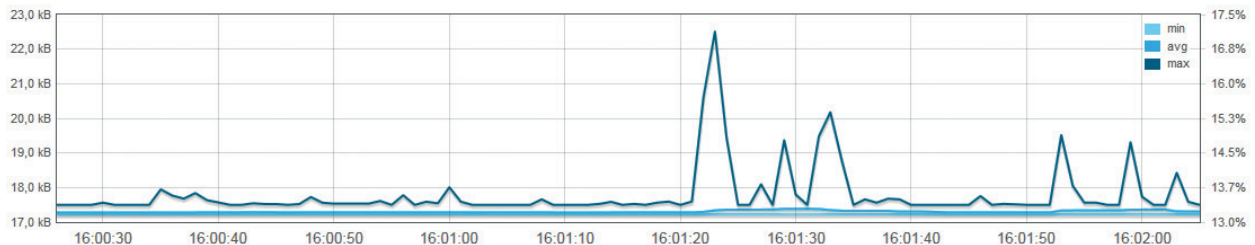
Integrated alarm management enables automatic forwarding of event notifications. By selecting a suitable information medium (e mail, message services, OPC, SNMP), all messages can be transmitted to the responsible persons in a timely manner. This shortens notification paths and prevents undesired plant downtimes.



### Netload chart

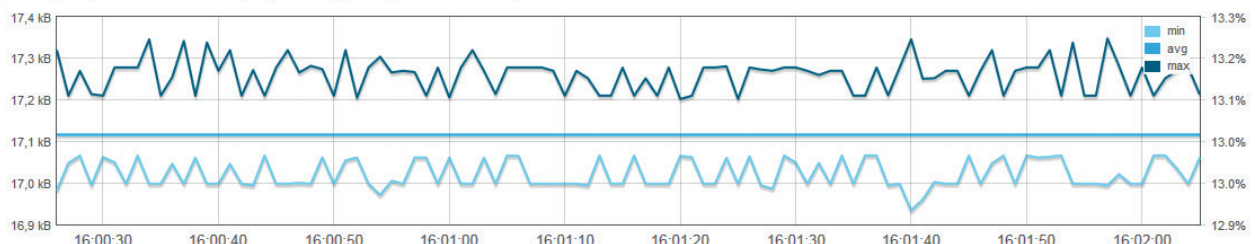
#### Incoming netload (per sec):

(Update rate: 10ms, number of cumulated values: 100; measuring point complies with one second)



#### Outgoing netload (per sec):

(Update rate: 10ms, number of cumulated values: 100; measuring point complies with one second)



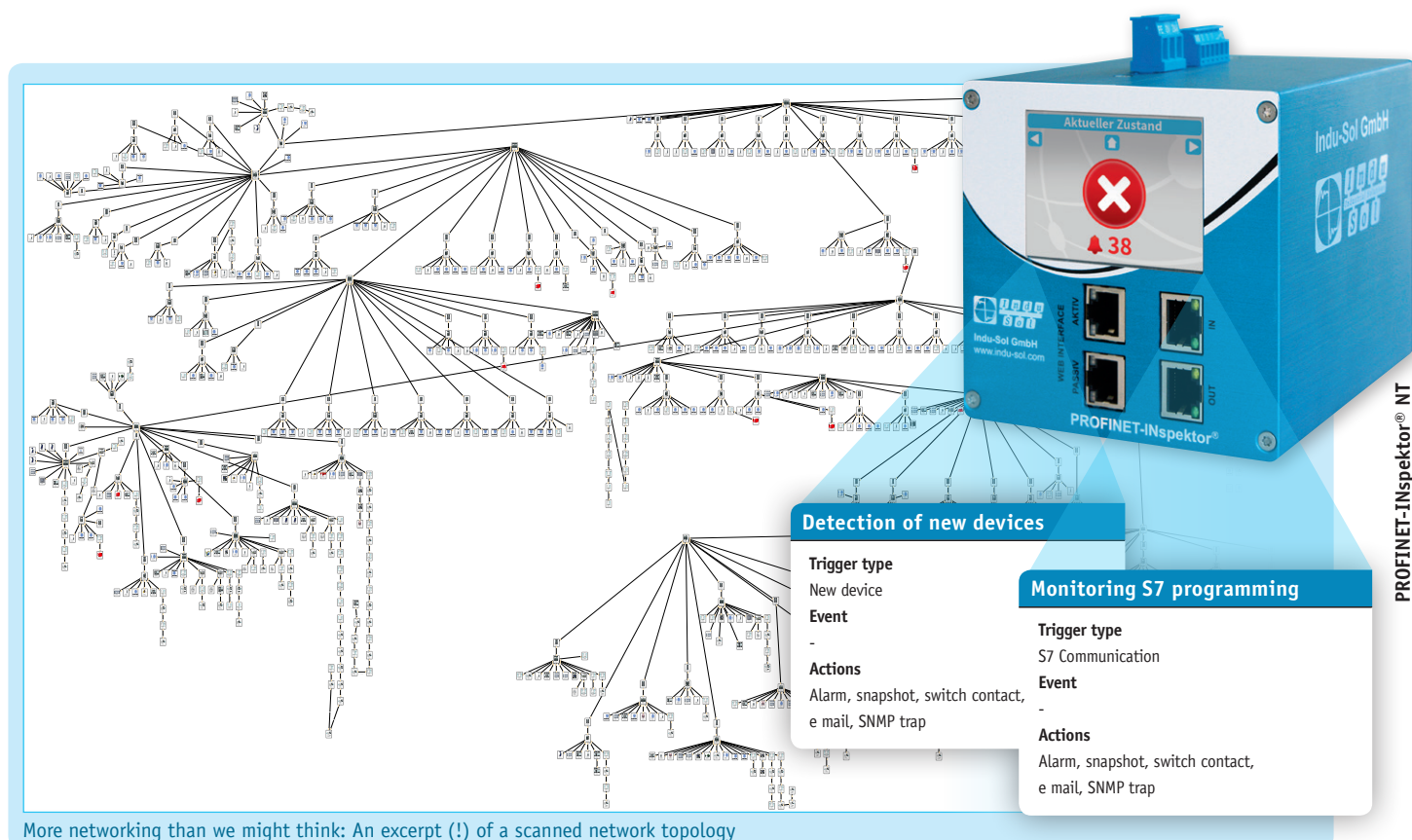
Network load displayed accurate to the millisecond



## Network security within the trusted zone

With the increase in networking in the industrial production sector, monitoring systems for maintaining network availability are faced with completely new additional requirements. Availability and security must go hand in hand. Until now, communication within an externally secured network area, the so-called trusted zone, was classified as trustworthy and therefore not controlled any further. In most cases these were the OT networks, which were planned as isolated units, at least to a large extent. However, only a topology scan (e. g. with **PROscan® Active V2**) reveals without a doubt all devices belonging to the network, and their real connections to each other. The extent of interconnection of machines and systems in industrial production is often underestimated in practice!

For this reason, the **PROFINET-INspektor® NT**, for example, functions not only as a measurement and diagnostic tool for determining data communication quality, but also as an intrusion detection system. It detects the presence of unknown devices in the network, and immediately alerts the operator – either by e mail, SNMP trap or, of course, via the tool's web interface. By means of this function, and network load resolution with millisecond accuracy, targeted attacks on specific devices can be identified on the basis of increased network load and flooding with requests (denial of service attacks). In addition, programming access attempts on the PLC are detected in order to identify manipulation. The **PROFINET-INspektor® NT** therefore serves both monitoring and security purposes.

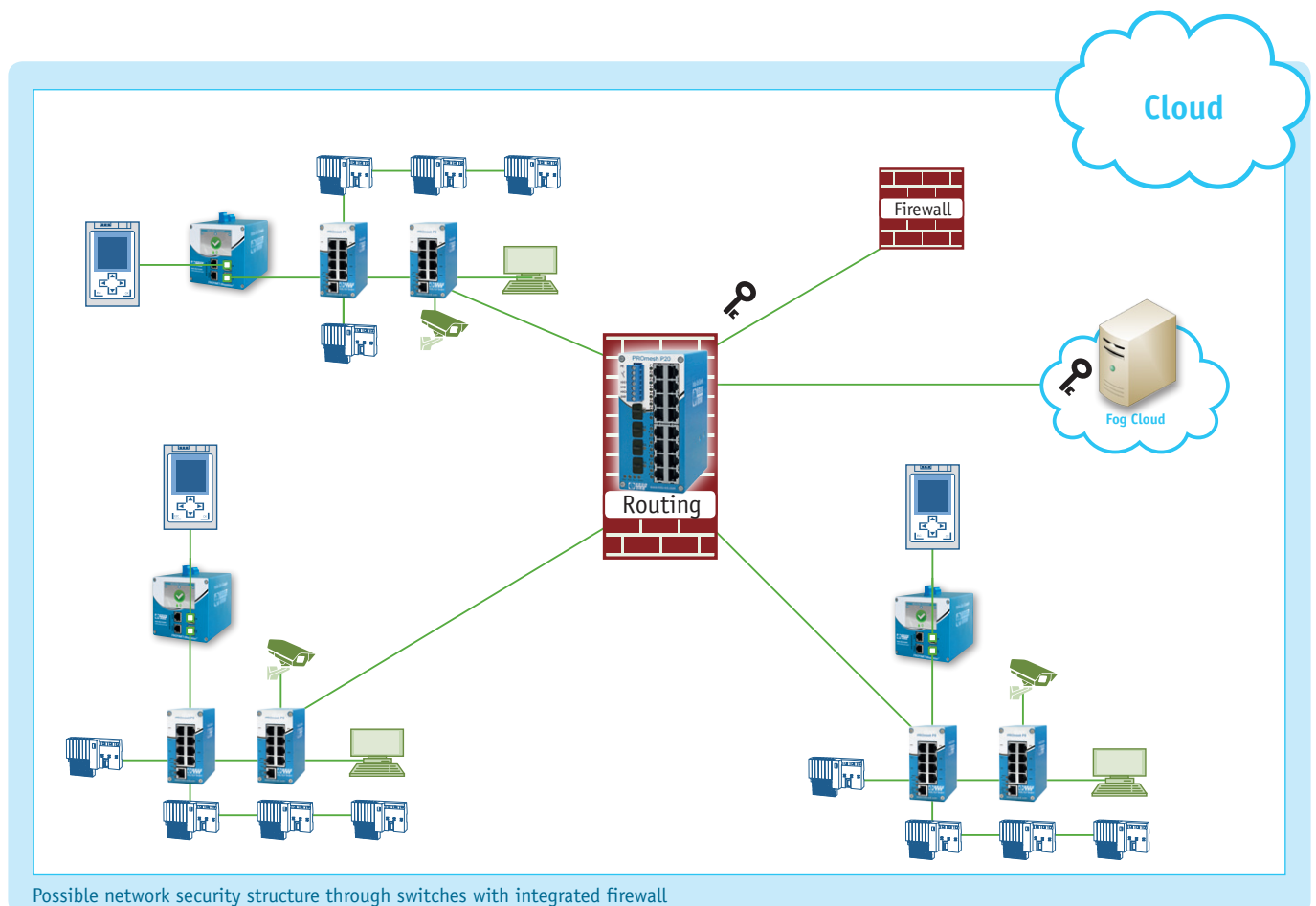


More networking than we might think: An excerpt (!) of a scanned network topology

The high number of access points to the network and the increasing level of networking of intelligent devices and components also make safety-relevant monitoring necessary within the automation network. In addition to the IT precautions, which are responsible for protection against external attacks, OT networks require independent monitoring: In these networks, no protective measures can be taken without at least partially sacrificing availability. Communication must, however, be permanently monitored in order to have at least the communication protocols available as a starting point for finding the cause in the event of safety-relevant incidents.

## Walling-off is not an option

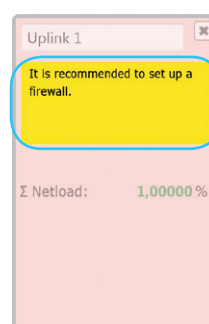
The reluctance of many operators to install security measures is often due to the great expense involved in IT-proven security solutions. In addition to the high costs, the immense configuration effort for firewalls, routers, user accounts, etc. is a deterrent. Moreover, these measures cannot be applied 1:1 to the protection of automation technology networks without compromising their availability. However, the isolationist approach of IT for the purpose of data protection runs counter to the idea of worldwide networking of production. Nevertheless, networks should be divided into segments and protected by firewalls.



However, despite the fact that there are no binding security standards for automation technology, trouble-free production will only be possible in the future if security and monitoring are equally guaranteed. Solutions that combine both requirements and are taking the first steps towards security are already available.

### Observing security measures during planning

The PROnetplan software provides security information and shows where this has to be implemented in the network.



### Security information

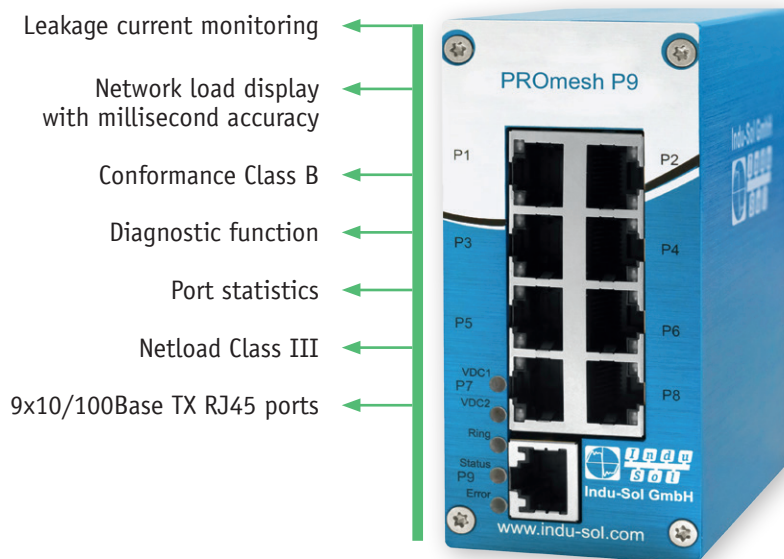
It is recommended to set up a firewall.

The user-friendly pop-ups with security information show immediately which devices have free ports that may need to be blocked, and where the use of a firewall might be advisable.



## Ethernet/PROFINET Switch PROmesh P9

The **PROmesh P9** is an Ethernet/PROFINET switch which has been designed for use in the open field, especially due to its high robustness against EMC influences. It provides leakage current monitoring, millisecond display of network load, diagnostic functions and port statistics, and is certified to Conformance Class B and Netload Class III.



### Web view

#### Main overview

##### Port statistics

All	Netload	Discards	Error	Time	History
					Last minute
					Last hour
Port 1 Partner: 10.1.9.2	Port 2 Partner: -				
Port 4 Partner: 10.1.9.23	Port 5 Partner: 10.1.9.29				
Port 7 Partner: -	Port 8 Partner: 10.1.9.24				

##### Leakage Current



### Leakage current



EMC coupling is becoming an increasingly common cause of network errors or even network failures. To prevent these, it makes sense to monitor leakage currents. The **PROmesh P9** and the **PROmesh P20** are therefore the first switches to offer leakage current monitoring. This feature can be used for acceptance tests, and replaces the shielding current measurement of EMC certification.

### Netload Class III



In the context of Industry 4.0, more and more data has to be transferred from your network. For your network quality, the directly directed traffic is much more harmful than indirectly directed traffic. As the only switches with more than 4 ports, the **PROmesh P9** and the **PROmesh P20** are certified according to Netload Class III, and therefore particularly resistant to direct traffic.

### Clear web interface



The proven traffic light system allows you to see at a glance which devices are experiencing problems. For more detailed analysis, the port statistics provide port-specific information on network load, errors and discards. Your maintenance personnel can thus quickly locate faulty devices, ensuring high availability of your network.

### Conformance Class B



The Ethernet/PROFINET switches **PROmesh P9** and **PROmesh P20** are optimized for the Industrial Ethernet standard due to the increasing number of new PROFINET systems. Conformance Class B certification enables you to cover 99 % of all PROFINET applications. This means that your PROFINET network is also optimally equipped for the future.

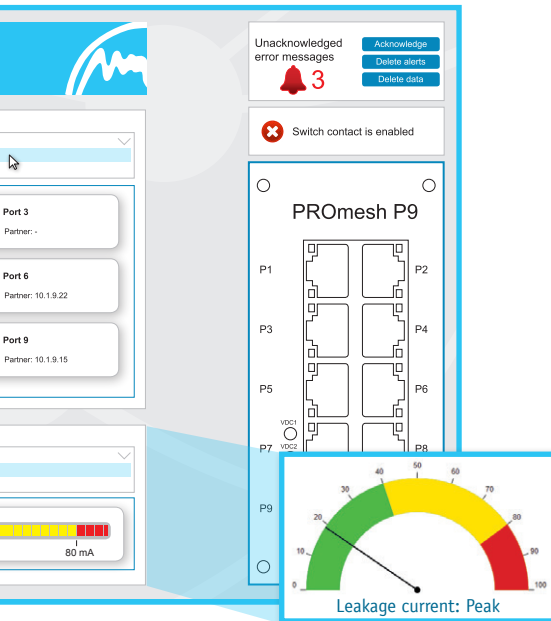




Simple. Unique. Pioneering.

## Ethernet/PROFINET Switch PROmesh P20

The **PROmesh P20** is an Ethernet/PROFINET switch that is designed to be used directly after the controller. With its four SFP modules, it offers a wide range of options for connecting fiberglass. It provides leakage current monitoring, a router function, millisecond display of network load, port statistics, diagnostic functions, and is certified to Conformance Class B and Netload Class III.



- Leakage current monitoring
- Network load display with millisecond accuracy
- Conformance Class B
- Diagnostic function
- Port statistics
- Router function
- Netload Class III
- 16x10/100Base TX RJ45 ports
- 4x SFP slot 1000 mbps copper/optical fibre

### Network load visualisation in ms



Discards and errors are usually caused by very short peaks. If the network load was only observed in the range of seconds or even minutes, then these load peaks could not be displayed, and a potential error might be overlooked. For diagnostic purposes, especially with regard to Industry 4.0, capturing the network limit in the millisecond range is therefore invaluable.



### Router function

Due to increasing networking, new demands are being made on data security and access rights. This is why the **PROmesh P20** has a router function. A Layer 3 port allows you to separate devices connected to the switch from the rest of the network. If required, individual connections to the higher-level network can be permitted.

### Diagnostic function



The **PROmesh P9** and **P20** can be adapted especially to your needs and individually to the network. In this way you are immediately informed about changes in your network if necessary:

- Number of error telegrams
- Number of discards
- Level of network load
- Correct port allocation
- Level of leakage current



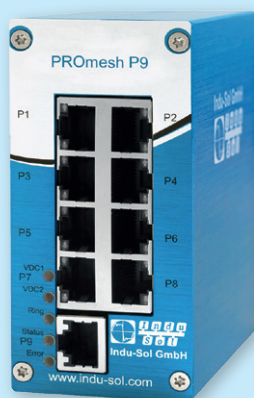
### SFP slots

SFP slots offer you an additional level of flexibility. The free slots can be occupied by the SFP modules. Such SFP modules are available in a wide variety of copper and optical fiber versions.

This allows you to optimize your **PROmesh P20** for your system. 16 Cu ports + 4 SFP slots



## Ethernet/PROFINET infrastructure components



**PR0mesh P9**

### Ordering Details

### Art. No.

PR0mesh P9

114110020

### PR0mesh P9

Ethernet/PROFINET Switch

- Connection type: 9\*10/100Base TX RJ45
- Technology: Store and Forward
- Applications: OT / IIT
- Port Mirroring: Yes
- PROFINET capable: Yes
- Leakage current monitoring: Yes
- Network load visualisation: Yes
- Discards visualisation: Yes
- Bandwidth control: Yes
- SD card storage medium: Yes
- Supported protocols: MRP; DCP; I&M; DCHP; IGMP; LLDP; PDEV; QoS; STP; SNMP; RSTP
- Diagnostics: LED, relay, SNMP, e mail
- Protection class: IP20
- Power supply: 24 V DC+/-20% redundant
- Dimensions (H\*W\*D): 105\*49\*112 mm
- Weight: 490 g
- Housing: Aluminium, anodised



**PR0mesh P20**

### Ordering Details

### Art. No.

PR0mesh P20

114110022

### PR0mesh P20

Ethernet/PROFINET Switch

- Connection type: 16\*10/100Base TX RJ45, 4\*1000Base SFP
- Technology: Store and Forward
- Applications: OT / IIT
- Port Mirroring: Yes
- NAT: Yes
- PROFINET capable: Yes
- Leakage current monitoring: Yes
- Network load visualisation: Yes
- Discards visualisation: Yes
- Bandwidth control: Yes
- SD card storage medium: Yes
- Supported protocols: MRP; DCP; I&M; DCHP; IGMP; LLDP; PDEV; QoS; STP; SNMP; RSTP; NAT
- Diagnostics: LED, relay, SNMP, e mail
- Protection class: IP30
- Power supply: 24 V DC+/-20% redundant
- Dimensions (H\*W\*D): 138\*68\*130 mm
- Weight: 960 g
- Housing: Aluminium, anodised

## Ethernet infrastructure components



**PR0mesh P8-E**

### PR0mesh P8-E

Ethernet Switch

- Connection type: 8\*10/100Base TX RJ45
- Technology: Store and Forward
- Applications: IIT
- Port Mirroring: Yes
- Web interface: Yes
- Network load visualisation: Yes
- Bandwidth control: Yes
- Supported protocols: LLDP; SNMP; RSTP; STP; IGMP; Telnet
- Diagnostics: LED, relay, SNMP, e mail
- Protection class: IP30
- Power supply: 12 V - 48 V DC redundant
- Dimensions (H\*W\*D): 138\*53\*110 mm
- Weight: 800 g
- Housing: Metal, powder-coated

#### Ordering Details

#### Art. No.

PR0mesh P8-E

114110050



**PR0mesh P16-E**

### PR0mesh P16-E

Ethernet Switch

- Connection type: 16\*10/100Base TX RJ45
- Technology: Store and Forward
- Applications: IIT
- Port Mirroring: Yes
- Web interface: Yes
- Network load visualisation: Yes
- Bandwidth control: Yes
- Supported protocols: LLDP; SNMP; RSTP; STP; IGMP; Telnet
- Diagnostics: LED, relay, SNMP, e mail
- Protection class: IP30
- Power supply: 12 V - 48 V DC redundant
- Dimensions (H\*W\*D): 160\*70\*130 mm
- Weight: 960 g
- Housing: Metal, powder-coated

#### Ordering Details

#### Art. No.

PR0mesh P16-E

114110080



## Ethernet infrastructure components



**PROmesh P12-GE**

### PROmesh P12-GE

Ethernet Switch

- Connection type: 8\*10/100/1000Base TX RJ45, 4\*1000Base SFP
- Technology: Store and Forward
- Applications: IIT
- Port Mirroring: Yes
- Web interface: Yes
- Network load visualisation: Yes
- Bandwidth control: Yes
- Supported protocols: ARP; ICMP; TCP; DHCP; DNS; HTTP; Telnet; Ring; RSTP; SNMP; LLDP; IGMP; GMRP
- Diagnostics: LED, relay, SNMP, e mail
- Protection class: IP30
- Power supply: 12 V - 48 V DC redundant
- Dimensions (H\*W\*D): 160\*70\*130 mm
- Weight: 960 g
- Housing: Metal, powder-coated

#### Ordering Details

#### Art. No.

PROmesh P12-E

114110070



**PROmesh PoE**

### PROmesh PoE

Ethernet Switch

- Connection type: 8\*10/100/1000Base TX RJ45, 2x Combo 10/100/1000Base, TX RJ 45 or 1000Base SFP
- Technology: Store and Forward
- Applications: IIT
- Port Mirroring: Yes
- Web interface: Yes
- Network load visualisation: Yes
- Bandwidth control: Yes
- Supported protocols: ARP; ICMP; TCP; DHCP; DNS; HTTP; Telnet; Ring; RSTP; SNMP; LLDP; IGMP; GMRP
- Diagnostics: LED, relay, SNMP, e mail
- Protection class: IP30
- Power supply: 12 V - 48 V DC redundant
- Dimensions (H\*W\*D): 160\*70\*130 mm
- Weight: 1070 g
- Housing: Metal, powder-coated

#### Ordering Details

#### Art. No.

PROmesh PoE

114110090



## Ethernet infrastructure components



**PRomesh P28-R**

### Ordering Details

### Art. No.

PRomesh P28-R

114110100

### PRomesh P28-R

Ethernet Switch

- Connection type: 16\*10/100/1000Base TX RJ45, 8x Combo 10/100/1000Base, TX RJ 45 or 1000Base SFP, 4\*1000Base SFP
- Technology: Store and Forward
- Applications: OT / IIT
- Port Mirroring: Yes
- Network load visualisation: Yes
- Bandwidth control: Yes
- Supported protocols: ARP; ICMP; TCP; UDP; DHCP; HTTP; HTTPS; Telnet; RSTP; DNS; MSTP; LLDP; LACP; IGMP; GMRP; SNMP
- Diagnostics: LED, relay, SNMP, e mail
- Protection class: IP30
- Power supply: 100 V - 240 V AC redundant
- Dimensions (H\*W\*D): 43\*440\*285 mm
- Fastening: 19 inch rack
- Weight: 3900 g
- Housing: Metal, powder-coated



**PRomesh P28-RL**

### Ordering Details

### Art. No.

PRomesh P28-RL

114110110

### PRomesh P28-RL

Ethernet Switch

- Connection type: 16\*10/100/1000Base TX RJ45, 8x Combo 10/100/1000Base, TX RJ 45 or 1000Base SFP, 4\*1000Base SFP
- Technology: Store and Forward
- Applications: OT / IIT / IT
- NAT: Yes
- Port Mirroring: Yes
- Network load visualisation: Yes
- Bandwidth control: Yes
- Supported protocols: IGMP; GMRP; SNMP; NAT; STP; RSTP; MSTP; DHCP; LLDP; SNTP; Telnet;
- HTTP/HTTPS; SSH; LACP
- Diagnostics: LED, relay, SNMP, e mail
- Protection class: IP30
- Power supply: 100 V - 240 V AC redundant
- Dimensions (H\*W\*D): 43\*440\*285 mm
- Fastening: 19 inch rack
- Weight: 3900 g
- Housing: Metal, powder-coated



## Ethernet/PROFINET infrastructure components



PROmesh P7X

### PROmesh P7X

Ethernet/PROFINET Switch

- Connection type: 7\*7 10/100Base M12
- Technology: Store and Forward
- Application: OT
- Web interface: Yes
- Network load visualisation: Yes
- PROFINET capable: Yes
- Digital I/O ports: Yes
- Protection class: IP67
- Power supply: 18 V - 32 V redundant
- Dimensions (H\*W\*D): 244\*84\*35 mm
- Weight: 1265 g
- Housing aluminium, powder-coated

#### Ordering Details

#### Art. No.

PROmesh P7X

114110040

## Analysis | diagnostics | measurement



### PROFINET INSpektor® NT

Analysis and diagnostic tool

The **PROFINET-INSpektor® NT** is an intelligent, passive measurement and diagnostic tool for temporary or permanent monitoring of PROFINET networks. Due to its passive and feedback-free behaviour, it is highly suitable for online analysis.

The **PROFINET-INSpektor® NT** is both a full-featured measuring device for network acceptance and a monitoring tool for condition monitoring.

#### Ordering Details

#### Art. No.

PROFINET-INSpektor® NT

124030100

## Analysis | diagnosis | measurement



### iPNMA

Intelligent PROFINET measuring point

The intelligent PROFINET measuring point **iPNMA** combines the functions of a PROFINET measuring point with a simple PROFINET network analysis.

In this case, the evaluation of the recorded data does not take place on the device itself, but instead all data is queried and processed for evaluation by the **PROmanage® NT** software.

In addition to the integrated diagnostics function, an analysis tool (e. g. **PROFINET-INSpektor® NT** or laptop) can be connected to the two monitor jacks (monitor M1 and M2) in a non-reactive way for a more thorough network analysis or troubleshooting.

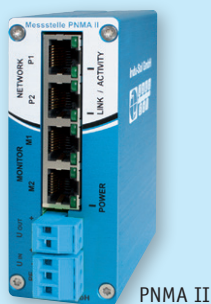
#### Ordering Details

#### Art. No.

iPNMA

114090200

## Infrastructure components



PNMA II



PNMX IP67

### PNMA II / PNMX

PROFINET measuring points

The **PNMA II** measuring point provides non-reactive access for telegram recording in the PROFINET and other Ethernet-based networks during running production. It is recommended to install the **PNMA II** measuring point permanently in the network connection between the automation device (controller) and the first switch, because the major part of the communication typically passes through here.

The measuring point in the **PNMX** version with **IP67** protection class can be installed in rough production environments without any protective housing. Diagnostic tools are connected via M12 measurement jacks (M12 D-coded).

#### Ordering Details

#### Art. No.

PNMA II

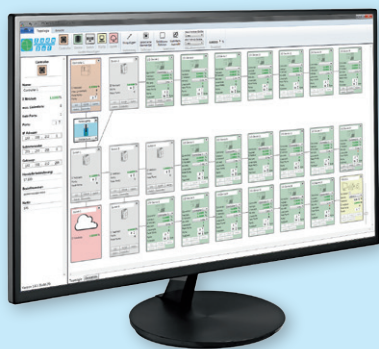
114090100

PNMX IP67 (for harsh environments)

114090300



## Network planning



### PROnetplan

Network planning software

**PROnetplan** is a software for the preliminary planning of industrial networks. The network can be assembled intuitively on a graphic interface.

With a simple simulation of the communication parameters and changes in the network structure, potential bottlenecks can be identified and eliminated during the planning stage.

The topology created with **PROnetplan** can be used both as a discussion platform with the client and as a document for a network installation, in addition to the objective of network optimization.

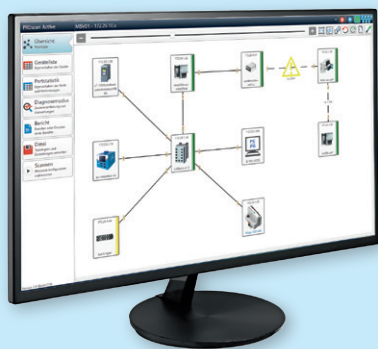
#### Ordering Details

PROnetplan

#### Art. No.

114010009

## Acceptance test and validation



### PROscan Active® V2

Acceptance and validation software

With the **PROscan® Active V2** software, PROFINET networks can be described and displayed in detail at any time under running production conditions – i. e. online. Thanks to the LLDP protocol (detection of neighbourhood relationships) integrated in PROFINET devices, it is possible to generate a complete topology map, including all designations and relationships, in an extremely short time, and thereby simultaneously perform an initial simple diagnosis (line interruptions, device failures etc.) during running operation.

The software helps you to efficiently organise a complex network and, if required, perform necessary maintenance in a timely and direct manner. Its low resource requirements enable **PROscan® Active V2** to be installed on any commonly available touch panel.

#### Ordering Details

PROscan® Active V2 – single license\*  
(basic license)

PROscan® Active V2 – 5-user license\*

PROscan® Active V2 – 25-user license\*

Upgrade PROscan® Active V1 to V2

#### Art. No.

117000053

117000057

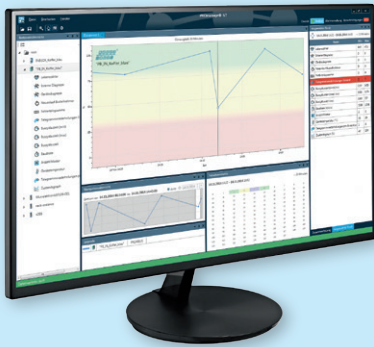
117000061

117000052

\*Further licenses upon request



## Permanent Network Monitoring



### PROmanage® NT

Network monitoring software

**PROmanage® NT** enables the assessment, analysis and long-term storage of condition data for fieldbus systems and other industrial networks. For this purpose, **PROmanage® NT** retrieves the port statistics of manageable switches and the events in the distributed data loggers (**INspektors®**), evaluates them and displays them graphically.

To improve system availability, the following targets are set for a PNM system:

- Continuous monitoring of real communication
- Complete monitoring and detection of causes of weak spots in the network
- Automatic alarms in the case of negative developments
- Central overview of all networks

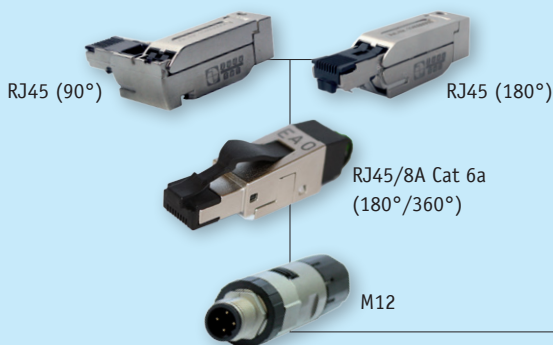
#### Ordering Details

#### Art. No.

PROmanage® NT (80 ports*)	117000032
PROmanage® NT (320 ports*)	117000034
PROmanage® NT (640 ports*)	117000036

\*Further licenses upon request

## PROFINET connectors and cables



#### Ordering Details

#### Art. No.

PROFINET connector RJ45 (180°)	114030003
PROFINET connector RJ45 (90°)	114030004
PROFINET connector RJ45/8A Cat 6a (180°)	112030008
PROFINET connector RJ45/8A Cat 6a (360°)	112030009
PROFINET connector M12	114030002

Cat5 - Type A - massive

Cat5 - Type B - flexible

Cat5 - Type C - drag-chain compatible

Cat5 - Type A - massive \*FE

Cat5 - Type B - flexible \*FE

#### Ordering Details

#### Art. No.

PROFINET cable Cat5 (Type A - solid)	114050010
PROFINET cable Cat5 (Type B - flexible)	114060001
PROFINET cable Cat5 (Type C - drag-chain compat.)	114070001
PROFINET cable *FE (Type A - solid)	114050011
PROFINET cable *FE (Type B - flexible)	114060003



## Services (Measurement | Training)



### Measurement / Troubleshooting

Network analysis / certification, troubleshooting

#### Ordering Details

#### Art. No.

Network analysis / Certification

210030000

Troubleshooting

210030003



### Training

PROFINET seminars

#### Ordering Details

#### Art. No.

One-day seminar (1 day)\*

220030012

User training PROFINET (2 days)\*

220030001



### Training

PROFINET seminar **PI certified** incl. exam

#### Ordering Details

#### Art. No.

Certified PROFINET Installer (2,5 days)\*

220030007

Certified PROFINET Engineer (2,5 days)\*

220030016



### Training

Security seminar

#### Ordering Details

#### Art. No.

One-day seminar (1 day)\*

220090010



### Training

Wireless LAN seminar

#### Ordering Details

#### Art. No.

Training Wireless LAN (2 days)\*

220080001

\* On-site training at your premises upon request.

## Notes



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