NEOX**PacketRaven HARDENED Network TAPs**

UNCOMPROMISINGLY SECURE NETWORK ACCESS ACCORDING TO IEC NORM 62443 THROUGH OUR FPGA-BASED NETWORK TAPS!

PacketRaven Hardened Network TAPs are active decoupling elements for secure and reliable tapping of network data in copper-based networks. These TAPs are looped into the network line to be monitored and route out all data traffic while maintaining data integrity, without interruption and without packet loss.

Using conventional SPAN ports, also called mirror ports, on the other hand, can distort the result, since this copying process works in store-and-forward mode and, for example, discards FCS/CRC faulty packets on OSI layer 2 instead of providing these Ethernet frames to the security or monitoring tool.

Our network TAPs do not have a MAC or IP address, but operate entirely on OSI Layer 1 and cannot be detected in the network without special and expensive measurement equipment. Hackers and attackers therefore have no chance. Because this tapping method ensures that the integrity of the outgoing data remains unaltered, our network TAPs are being used more and more in the areas of network forensics, security and monitoring.

Furthermore, our hardened TAPs behave passively on the network side. In case of a power failure or arbitrary deactivation like a cable bridge, it ensures that the active network connection is not interrupted or at least continues to work without TAP function. Thus, the active line is not negatively affected.
To ensure the highest possible reliability on the monitoring side, our Hardened TAPs have redundant power supplies, but can also be additionally or exclusively powered or protected with 12-48V DC voltage and/or via a PoE power supply.

To further harden our IEC 62443 certified Hardened Network TAPs, they have a secure and encrypted Secure-Boot firmware and are equipped with special security screws and seals that protect them against unwanted modifications. In addition, they are delivered with different fixed configurations, depending on customer requirements.

These models of the PacketRaven Network TAPs product family were designed as portable TAPs, but can also be installed in a 19" mounting frame in data centers using a mounting kit, or on DIN rails using a DIN rail clip, and support network speeds of 10Mbps, 100Mbps and 1Gbps.

With PacketRaven network TAPs you get permanent network access without risk and provide e.g. your monitoring tools with 100% reliable network data - without introducing a single point of failure.

👁	Full Network Transparency
	No impairment of Data Traffic
	100% Network Data
	Invisible for Attackers
	No Network Access via Monitoring Port
	Flexible to Use
	Plug-n-Play
	Failure Protection on Power Loss
	PoE+ Power over Ethernet
	Redundant Power Supply
	Fast and Precise
	Support Jumbo Frames
	Made in Germany

HIGHLIGHTS

Secure, rock-solid FPGA-based design

Supported network speeds of 10M, 100M and 1G

Alternative to SPAN ports - mirrors 100% of traffic including FCS/CRC errored packets that may be discarded by SPANs

Guarantees no packet loss

Powered by redundant AC/DC power supplies or DC voltage

Support PoE 802.3af passthrough and power supply via PoE

Support failsafe mode for failover in case of power failure

Support breakout, aggregation or regeneration mode

Support up to 16k jumbo frames

Plug-n-Play, no complex configuration necessary or possible

SECURITY HIGHLIGHTS

Invisible in the network - no IP address, no MAC address, cannot be hacked

Data Diode Function - 100% reaction-free due to galvanic isolation

Preconfigured - do not allow subsequent configuration changes

Secureboot Firmware - at every start of the TAP it is checked if the firmware to be executed has a valid signature and an authorized public key "Key".

Security screws - special tools required

Security seals - cannot be removed unnoticed

IEC 62443 certified and KRITIS approved

Designed, assembled, certified and tested in Germany

ADVANCED SECURITY FUNCTIONS

Our Network TAPs with RJ45 monitoring output work like a data diode and thus physically isolate the monitoring ports from the network ports. This ensures that, for security reasons, access to the network via the monitoring ports is prevented on the hardware side.

PacketRaven Network TAPs are therefore already in the standard version among the network components through which an attack vector is excluded (see page 1).

For high-security areas according to IEC 62443 and critical infrastructures (CRITIS), however, even this is sometimes not sufficient, which is why NEOX Networks now also offers a specially hardened version of its TAPs.

These TAPs can, if desired, be delivered pre-configured and then do not allow any subsequent configuration changes.
In addition, they are secured against unwanted or unnoticed opening by special screws and security seals.

And to round it all off, these TAPs also have a specially secured and encrypted firmware. Secureboot checks each time the TAP is started whether the firmware to be executed has a valid signature and an authorised public key.

If this is not the case, the TAP cannot be put into operation.

Preconfigured
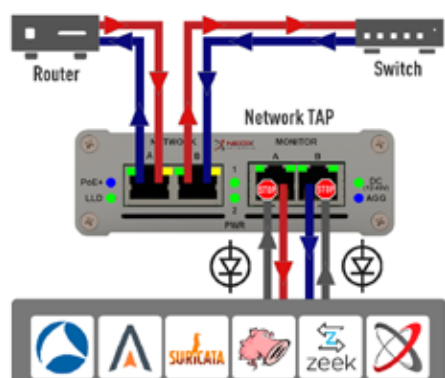
Secure-Boot

Security Seals

Security Screws

DATA DIODE FUNCTION

Data Diodes ensure unidirectional communication and ensure that traffic can only flow in one direction.

Unidirectional network devices are typically used to ensure information security or the protection of critical digital systems, such as industrial control systems or production networks from cyber attacks.

Our TAPs work like a diode and do not allow access to the network via the monitoring ports for security reasons.

By adding this further layer of security, it is therefore not possible to compromise the network connection and the productive network.

POE - POWER OVER ETHERNET FUNCTIONS

The TAP supports both passive PoE and active PoE for passing through the power supply to a PoE-capable device:

- PoE/PoE+ pass-through according to IEEE802.af - the maximum power consumption that an end device can draw via the TAP is 12.95W.
- Power supply of the TAP via PoE according to IEEE802.af (active/passive)

TAP Power Supply via PoE

To connect the TAP to a PoE port according to IEEE802.af, please follow the installation steps below:

1. First connect the TAP to the PSE (Power Sourcing Equipment) device and make sure that the PoE+ LED lights up.
2. As soon as this lights up, the PSE and the TAP have negotiated the power supply and you can now connect your PoE end device to the TAP.

This sequence must be followed so that the TAP can properly establish power supply via a PSE device per IEEE802.af. All other power supply inputs on the TAP can still be used; the PoE power supply increases the redundancy in this case.

INDIVIDUALLY CONFIGURED AVAILABLE

Due to the FPGA chipset on which our active TAPs are based, it is possible to programme these models according to customer-specific requirements.
For example, TAPs with fixed operating mode and/or fixed speed, time stamping of outgoing packets, and much more.

INTERFACES

1	Network Ports A & B and Status LEDs	5	Power over Ethernet (PoE Plus) and Link Loss Detection (LLD) LEDs
2	RJ45, SFP, or M12 monitoring ports A & B and status LEDs	6	DIP switch for setting TAP mode
3	Aggregation LEDs	7	Connection for 12-48V DC voltage
4	DC power LEDs (2x for 5V AC/DC, 1x for 12-48V DC)	8	Redundant connections for 2 AC/DC power supplies (5V)

Front View

Copper TAP

SFP TAP

Fiber TAP

M12 TAP
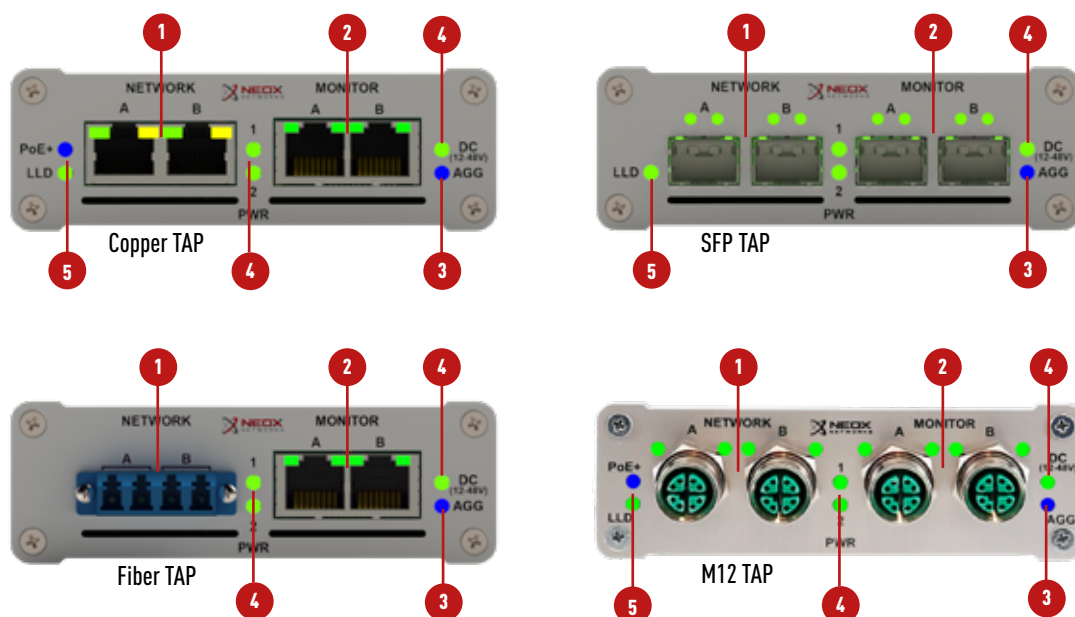
Back View
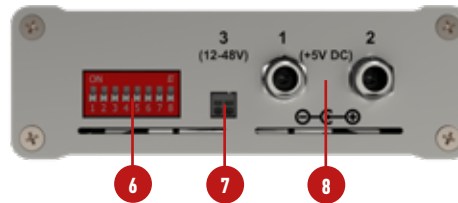
MOUNTING OPTIONS

⚠ Of course, TAPs with rack mounting brackets or DIN rail clips can also be used in mobile applications!

1. Mobile Use

Our standard models are designed for mobile use (without additional accessories), but can also be installed in a server rack using an additional server rack mounting frame (PRP-1U3-V2) and rackmount frame mounting kit (PRP-1U3-CLIP), or mounted on a DIN top-hat rail using a DIN top-hat rail clip (PRP-DIN-CLIP).
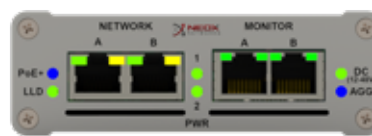
PacketRaven Network TAP for mobile use

Handy and portable

2. Rackmount Frame Installation

To install our portable TAPs in a server rack, you need our server rackmounting frame with item number **PRP-1U3-V2**, as well as a rackmount frame mounting kit (item number **PRP-1U3-CLIP**) for the TAP.

The PRP-1U3-V2 server rackmounting frame provides space for up to 3 portable PacketRaven Network TAPs.

Both components are available as accessories.

TAP with rackmounting kit for rackmount frame PRP-1U3-V2

Rackmount frame PRP-1U3-V2 for up to 3 PacketRaven Network TAPs

3. DIN Rail Installation

As a further alternative, we also offer a DIN rail clip for our TAPs for mounting on a TS35/7.5 DIN rails. This clip can be rotated by 180° so that the connections of the TAP can be aligned according to the respective requirements.

This DIN rails clip, available as an accessory, has the item number **PRP-DIN-CLIP**.

TS35/7.5 DIN rail

**Network TAP
with DIN rail clip**
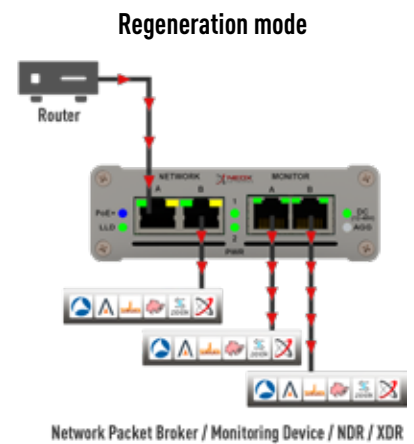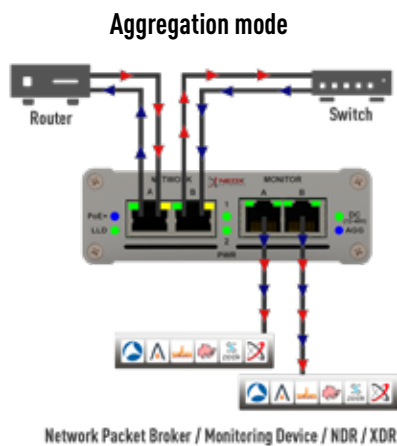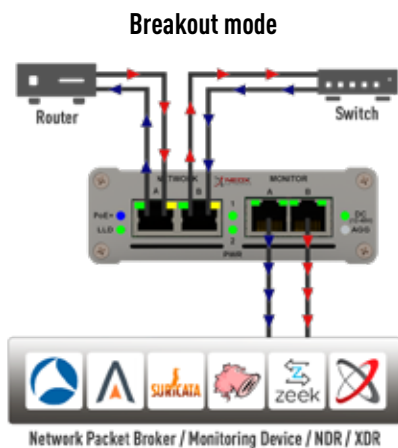
CONNECTION RELIABILITY IN CASE OF POWER LOSS

With all our active Network TAPs (except the SFP TAP) it is guaranteed that a loss of the TAP power supply will not lead to a failure of the active network line.

Only the devices connected to the monitoring port may no longer be supplied with data.
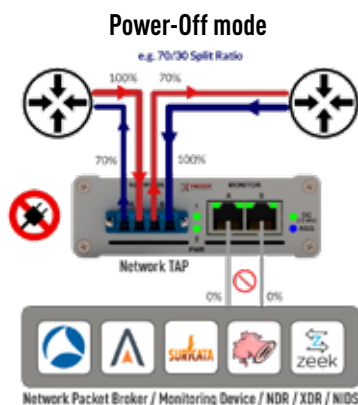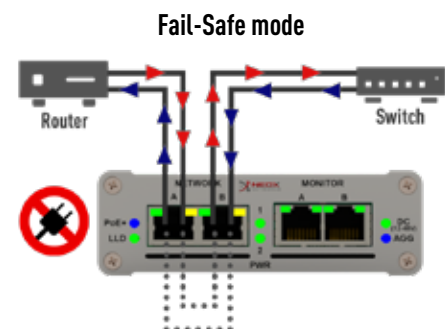
AVAILABLE TAP MODES

Our Hardened TAPs can be delivered pre-configured at the customer's request. A subsequent change of the operating mode is then no longer possible!

- **Breakout**: Each Ethernet packet transmitted via the network line is mirrored separately in this mode while maintaining data integrity in the TAP. The send and receive directions are output separately on the two monitoring ports so that the network traffic can be analysed per data direction in this case. Another great advantage of the Breakout mode is the visibility of the network traffic even with a fully loaded network connection. In this mode, the set network speed is transferred to the monitoring ports.

- **Aggregation**: In this mode, the data streams are bundled and output aggregated on both of the monitoring ports. This allows you to evaluate the network data of a full duplex line simultaneously with a single network interface on your analyzer. Due to the aggregation in hardware (FPGA), faulty packet sequences during recording are a thing of the past in this mode. For example, you can analyse the entire data traffic aggregated in 100Base-Tx lines without loss.

- **Regeneration**: Regeneration is used to capture 100% full duplex traffic that can be sent to multiple monitoring devices (up to 3 in this case) for analysis of your network. In this mode, the network speed settings are synchronised as in Breakout mode and the setting on the DIP switch is applied to all ports.

Breakout mode

Network Packet Broker / Monitoring Device / NDR / XDR

Aggregation mode

Network Packet Broker / Monitoring Device / NDR / XDR:

Regeneration mode

Network Packet Broker / Monitoring Device / NDR / XDR

Fail-Safe mode: Since Network TAPs are usually installed in critical network lines, it must be ensured that TAPs do not affect the line in any way.

By means of fail-safe, the TAP behaves like a cable bridge in the event of a failure or arbitrary deactivation and ensures that the active network connection is not interrupted or at least continues to function without the TAP function and thus does not negatively affect the active line.

Fail-Safe mode

Power-Off mode

e.g. 70/30 Split Ratio

Network TAP

Network Packet Broker / Monitoring Device / NDR / XDR / NIDS
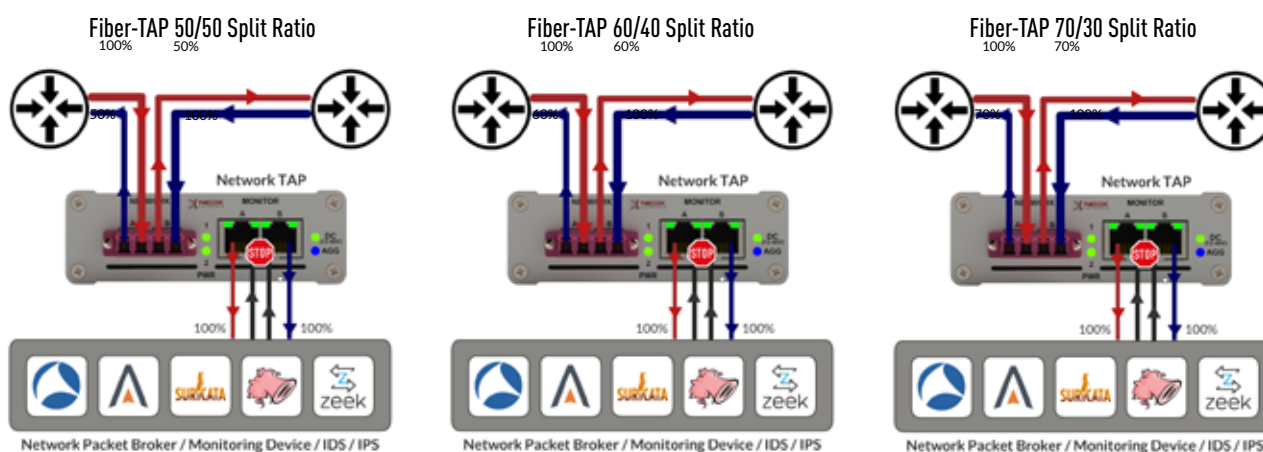
Passive/Power Off mode:
If the power supply fails, the active network connection is not interrupted!
Only the devices connected to the monitoring port are no longer supplied with data.

SPLIT RATIOS / LIGHT EXTRACTION

To extract traffic copy from an optical fiber link, a portion of the available signal power must be strategically separated. This process is guided by the split ratio., which represents the proportion of the signal power that remains devoted to the primary fiber link, compared to the fraction that is redirected towards the monitoring ports of the TAPs. The proficient management of this split ratio is vital to maintain optimal network performance while ensuring robust network monitoring capabilities.

A predetermined split ratio, such as 70/30, denotes that 70% of the optical signal power is reserved for the network link, with the remaining 30% being diverted to the monitoring ports. Contrary to this, TAPs equipped with RJ45/copper or SFP-based monitoring outputs utilize Optical-Electrical-Optical (OEO) conversion - a process that translates the optical signal into a newly born electrical signal. This process ensures that the monitoring port is provided with the full, undiminished signal strength.

TECHNICAL SPECIFICATIONS

NETWORK TAP	
Dimensions:	10.60 cm x 3.50 cm x 16.40 cm
Weight:	ca. 450g
Consumption:	max. 3 Watt at 5V/0.6A
Storage temperature:	-40° to 70°C
Operating temperature:	0° to 55°C
Relative humidity in operation:	20% to 80%, non-condensing
Certifications:	CE, FCC, RoHS, WEEE, EN 55032 KL. A/B, EN 55035, EN 61000-3-2, EN 61000-3-3, EN 61000-6-2, EN 50121-4:2016, EN 50129, IEC 62443-4-2:2019 Security Level Capability 2 (SL-C 2)

POWER SUPPLIES*	
Input voltage:	110V-240V AC 50-60Hz
Output voltage:	5V DC
Output current:	2A
Power:	max. 10 Watt
Power plug:	with interchangeable plug head
5V Cable:	with ferrite ring
5V Connector:	- screwable hollow plug - 5.5 mm outer diameter - 2.1 mm inner diameter

* Optional power supply units for connection via C13-C14 cable available (see accessories)

| ATTENUATION VALUES				WAVELENGTHS
SPLIT RATIO (OTHERS ON REQUEST)	50:50	60:40	70:30	
Singlemode OS1, OS2	3.4 dB / 3.4 dB	2.5 dB / 4.5 dB	1.7 dB / 5.8 dB	1310nm
Multimode OM4	3.8 dB / 3.8 dB	2.8 dB / 4.8 dB	2.2 dB / 6.1 dB	850nm
Multimode OM5	3.8 dB / 3.8 dB	2.8 dB / 4.8 dB	2.2 dB / 6.1 dB	850nm - 950nm
Multimode OM3	3.8 dB / 3.8 dB	2.8 dB / 4.8 dB	2.2 dB / 6.1 dB	1310nm

TAP MODELS

⚠️ The accessories required for a server rack installation or top-hat rail installation is explained in more detail under "MOUNTING OPTIONS"!
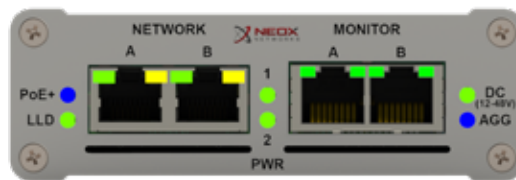
PRP-SCC-1Gx

RJ45 / COPPER TAPS

ITEM NO.	STANDARD	NET-WORK	INTERFACES NET./MON.		OPERATING MODES
PRP-SCC-**1GA**-S	10/100/1000Base-T	10M/100M/1G	RJ45	RJ45	Aggregation, Breakout, Regeneration
PRP-SCC-**1GA0**-S	10/100/1000Base-T	10M/100M/1G	RJ45	RJ45	Aggregation
PRP-SCC-**1GB0**-S	10/100/1000Base-T	10M/100M/1G	RJ45	RJ45	Breakout
PRP-SCS-1G**A**-S	10/100/1000Base-T	10M/100M/1000M	RJ45	SFP	Aggregation, Breakout, Regeneration
PRP-SCS-1G**A0**-S	10/100/1000Base-T	10M/100M/1000M	RJ45	SFP	Aggregation
PRP-SCS-1G**B0**-S	10/100/1000Base-T	10M/100M/1000M	RJ45	SFP	Breakout

PRP-M12-1Gx

M12 / COPPER TAPS

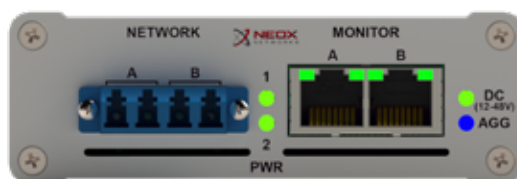| ITEM NO.	STANDARD	NET-WORK	INTERFACES NET./MON.		OPERATING MODES
PRP-M12-1GA-S	10/100/1000Base-T	10M/100M/1G	M12 (X-kodiert)	M12 (X-kodiert)	Aggregation, Breakout, Regeneration
PRP-M12-1GA0-S	10/100/1000Base-T	10M/100M/1G	M12 (X-kodiert)	M12 (X-kodiert)	Aggregation
PRP-M12-**1GB0**-S	10/100/1000Base-T	10M/100M/1G	M12 (X-kodiert)	M12 (X-kodiert)	Breakout

PRP-SSS-1Gx

SFP-TAP				
ITEM NO.	STANDARD	NETWORK	INTERFACES NET./MON.		OPERATING MODES
PRP-SSS-1GA-S	100Base-FX, 100Base-TX, 1000Base-LX, 1000Base-SX, 1000Base-ZX, 1000Base-T	100M/1G	SFP	SFP	Aggregation, Breakout, Regeneration

PRP-OS2-SLx

OS2 1000BASE-LX SINGLEMODE FIBER TAPS							
All TAPs for fiber type OS2 are also OS1 compatible!							
ITEM NO.	STANDARD	NET-WORK	FIBER TYPE	WAVE-LENGTH	INTERFACES NET./MON.		OPERATING MODES
PRP-OS2-SLC-*-**1GA**-S	1000Base-LX	1G	OS2	1310 nm	LC Singlemode	RJ45	Aggregation, Breakout, Regeneration
PRP-OS2-SLC-*-**1GAO**-S	1000Base-LX	1G	OS2	1310 nm	LC Singlemode	RJ45	Aggregation
PRP-OS2-SLC-*-**1GBO**-S	1000Base-LX	1G	OS2	1310 nm	LC Singlemode	RJ45	Breakout

OS2 1000BASE-ZX SINGLEMODE FIBER TAPS							
All TAPs for fiber type OS2 are also OS1 compatible!							
ITEM NO.	STANDARD	NET-WORK	FIBER TYPE	WAVE-LENGTH	INTERFACES NET./MON.		OPERATING MODES
PRP-OS2-SLZC-*-**1GA**-S	1000Base-ZX	1G	OS2	1550 nm	LC Singlemode	RJ45	Aggregation, Breakout, Regeneration
PRP-OS2-SLZC-*-**1GAO**-S	1000Base-ZX	1G	OS2	1550 nm	LC Singlemode	RJ45	Aggregation
PRP-OS2-SLZC-*-**1GBO**-S	1000Base-ZX	1G	OS2	1550 nm	LC Singlemode	RJ45	Breakout

*Split ratio - e.g. „**70**″ for a split ratio of 70:30, „**60**″ for 60:40, „**50**″ for 50:50.*
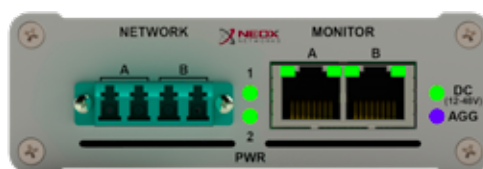
PRP-OM3FX-SLC-x

OM3 100BASE-FX MULTIMODE FIBER TAPS							
ITEM NO.	STANDARD	NET-WORK	FIBER TYPE	WAVE-LENGTH	INTERFACES NET./MON.		OPERATING MODES
PRP-OM3FX-SLC-*-**100MA**-S	100Base-FX	100M	OM3	1310 nm	LC Multimode	RJ45	Aggregation, Breakout, Regeneration
PRP-OM3FX-SLC-*-**100MAO**-S	100Base-FX	100M	OM3	1310 nm	LC Multimode	RJ45	Aggregation
PRP-OM3FX-SLC-*-**100MBO**-S	100Base-FX	100M	OM3	1310 nm	LC Multimode	RJ45	Breakout

*Split ratio - e.g. „**70**″ for a split ratio of 70:30, „**60**″ for 60:40, „**50**″ for 50:50.*

PRP-OM3FX-SLC-x

OM4 100BASE-FX MULTIMODE FIBER TAPS							
All TAPs for fiber type OM4 are also OM3 compatible!							
ITEM NO.	STANDARD	NET-WORK	FIBER TYPE	WAVE-LENGTH	INTERFACES NET./MON.		OPERATING MODES
PRP-OM4FX-SLC-*-**100MA**-S	100Base-FX	100M	OM4	1310 nm	LC Multimode	RJ45	Aggregation, Breakout, Regeneration
PRP-OM4FX-SLC-*-**100MAO**-S	100Base-FX	100M	OM4	1310 nm	LC Multimode	RJ45	Aggregation
PRP-OM4FX-SLC-*-**100MBO**-S	100Base-FX	100M	OM4	1310 nm	LC Multimode	RJ45	Breakout

** Split ratio - e.g. „**70** " for a split ratio of 70:30, „**60** " for 60:40, „**50** " for 50:50.*
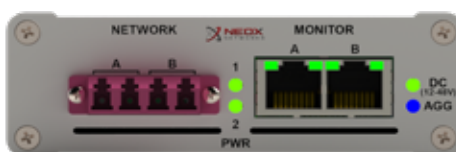
PRP-OM4-SLC-x

OM4 1000BASE-SX MULTIMODE FIBER TAPS							
All TAPs for fiber type OM4 are also OM3 compatible!							
ITEM NO.	STANDARD	NET-WORK	FIBER TYPE	WAVE-LENGTH	INTERFACES NET./MON.		OPERATING MODES
PRP-OM4-SLC-*-**1GA**-S	1000Base-SX	1G	OM4	850 nm	LC Multimode	RJ45	Aggregation, Breakout, Regeneration
PRP-OM4-SLC-*-**1GAO**-S	1000Base-SX	1G	OM4	850 nm	LC Multimode	RJ45	Aggregation
PRP-OM4-SLC-*-**1GBO**-S	1000Base-SX	1G	OM4	850 nm	LC Multimode	RJ45	Breakout

** Split ratio - e.g. „**70** " for a split ratio of 70:30, „**60** " for 60:40, „**50** " for 50:50.*
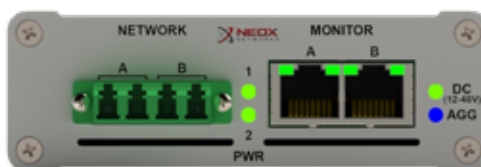
PRP-OM5-SLC-x

OM5 1000BASE-SX MULTIMODE FIBER TAPS							
All TAPs for fiber type OM5 are also OM4 and OM3 compatible!							
ITEM NO.	STANDARD	NET-WORK	FIBER TYPE	WAVE-LENGTH	INTERFACES NET./MON.		OPERATING MODES
PRP-OM5-SLC-*-**1GA**-S	1000Base-SX	1G	OM5	850 nm – 950 nm	LC Multimode	RJ45	Aggregation, Breakout, Regeneration
PRP-OM5-SLC-*-**1GAO**-S	1000Base-SX	1G	OM5	850 nm – 950 nm	LC Multimode	RJ45	Aggregation
PRP-OM5-SLC-*-**1GBO**-S	1000Base-SX	1G	OM5	850 nm – 950 nm	LC Multimode	RJ45	Breakout

** Split ratio - e.g. „**70** " for a split ratio of 70:30, „**60** " for 60:40, „**50** " for 50:50.*

ACCESSORIES

INSTALLATION

ITEM NO.	DESCRIPTION
PRP-1U3-V2	Server rack mounting frame for 3 portable TAPs
PRP-1U3-BP-V2	Blank plate for rack mounting frame PRP-1U3-V2
PRP-1U3-CLIP	TAP rackmount frame bracket for rack mounting frame PRP-1U3-V2
PRP-DIN-CLIP	TAP DIN rail mounting clip

PRP-DIN-CLIP

PRP-1U3-CLIP

PRP-1U3-V2   **PRP-1U3-BP-V2**

POWER SUPPLIES & ACC.

ITEM NO.	DESCRIPTION
PRP-PS-INT	PSU with EU, UK, and US plug head
PRP-PS-*-A	Plug head *EU, *UK or *US
PRP-PS-EU	Power supply unit with EU plug (head)
PRP-PS-UK	Power supply unit with UK plug (head)
PRP-PS-US	Power supply unit with US plug (head)
PRP-PS-C14-25W	Power supply unit with C14 socket - connected to PSU via C13-C14 cable

PRP-PS-INT   **PRP-PS-C14-25W**

M12 CABLES

ITEM NO.	CONN. 1	CONN. 2	DESCRIPTION
NX-M12-RJ45-*	RJ45	M12	IP20, flammability class: FT2, Cat.5e
NX-M12-M12-*	M12	M12	IP67, flammability class: FT2, Cat.6a

„1M" for 1 meter, „2M" for 2 meters, „3M" for 3 meters and „5M" for 5 meters.

M12 cables

NEOX NETWORKS
NEXT GENERATION NETWORK VISIBILITY

SecurITy
made in Germany
Trust Seal
www.teletrust.de/itsmig