opticalCON I **power**MONITOR
User Manual

NEUTRIK

version 1.4

1. Warning & Important Notice

FCC Approval

This device complies with part 15 of the FCC Rules. Operation is subject to the following two conditions: (1) This device may not cause harmful interference, and (2) this device must accept any interference received, including interference that may cause undesired operation.

CE Approval

Neutrik AG declares under its sole responsibility that the product optical-CON powerMONITOR to which this declaration is referred to has been designed and manufactured in accordance with the following international standards
IEC 61300; IEC 61326; IEC 60068-2-6; IEC 60068-2-31

CAUTION: Dispose

Dispose of your instrument in accordance with the valid legal environmentally regulations in your country

WARNING: Laser Handling Precautions

Laser light can damage your eyes. Laser light is invisible. Viewing it directly does not cause pain. The iris of the eye will not close involuntarily when viewing a bright light, consequently, serious damage to the retina of the eye is possible. Never look into the end of a fiber which may have a laser coupled to it. DO NOT use magnifiers in the presence of laser radiation. Diffused laser light can cause eye damage if focused with optical instruments. Should accidental exposure to laser light be suspected, arrange for an eye examination immediately.

CAUTION: Important Notice

The user manual or instruction manual for an intentional or unintentional radiator shall caution the user that changes or modifications not expressly approved by the party responsible for compliance could void the user's authority to operate the equipment.

CAUTION: Battery

- Avoid short circuits
- Operate and charge the battery between 0°C and +45°C.
- Do not heat the battery above 60°C.
- Do not dispose of the battery by burning.
- Do not solder directly to the battery.
- Do not disassemble the battery.
- Do not insert the battery in reverse polarity.

The Li-Io battery has a potential for fire or burning.

CAUTION: Cable Handling

Fiber optic cable is sensitive to excessive pulling, bending and crushing forces. Consult the cable specification sheet for the cable you are installing. Do not bend cable more sharply than the minimum recommended bend radius. Do not apply more pulling force to the cable than specified. Do not crush the cable or allow it to kink. Doing so may cause damage that can alter the transmission characteristics of the cable which may have to be replaced as a result.

Content

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2. Specifications

Power supply:	5V DC external
Battery (rechargeable):	2x 1.5V AA
Battery lifetime:	72 h
max. Current	250 mA
Power Adapter:	110 VAC – 220VAC
Temp. range:	0°C – 70°C
Housing:	steel, gal/black painted
Connectivity:	opticalCON; LC
Return loss:	> 45 dB
Insert loss:	< 0.5 dB
Factory calibration:	-5 dBm (+/- 0.1) -12 dBm (+/- 0.3) -24 dBm (+/- 0.5)
Area of operation:	SM: +3 dBm to -30 dBm
Wavelengths:	single-mode: 1310/1550 nm multimode: 850/1300 nm
Internal fiber:	single-mode: 9/125 um multimode: 50/125 um
Protection class:	IP 40
Vibration:	IEC 60068
Shock:	IEC 60068
Signal smoothing:	1s
FCC:	FCC / 47CFR Port 5 (Subpast B, Class B, digital Device)

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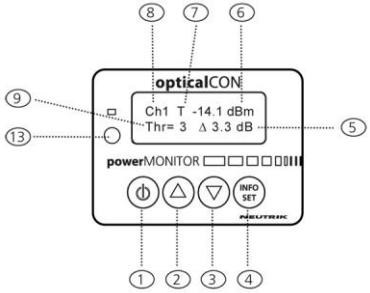
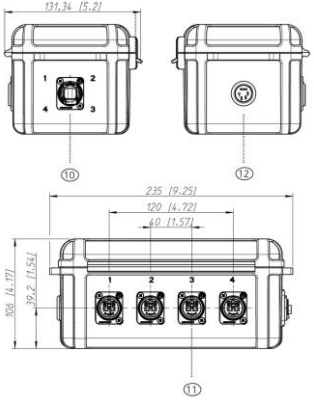
3. Keys and Connectors





No	Function
1	Power ON / OFF button
2	UP botton ▲
3	Down button ▼
4	INFO / SET button
5	Relative attenuation
6	Absolute attenuation
7	Charging character
8	Chosen channel
9	Threshold level
10	Fiber input - opticalCON
11	Fiber output - opticalCON
12	External power supply - (5V DC)
13	Alarm (red light)

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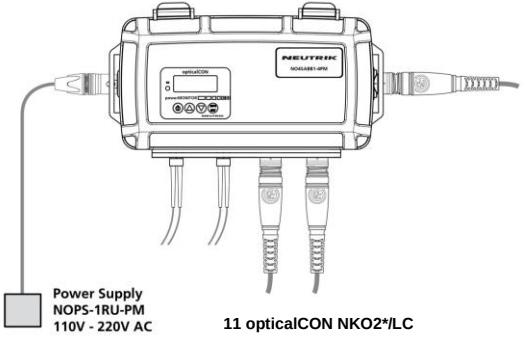
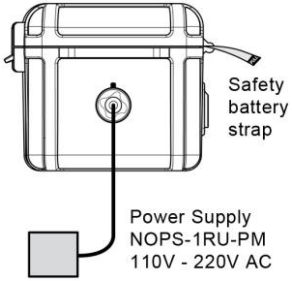
... Keys And Connectors



11 opticalCON NKO2*/LC

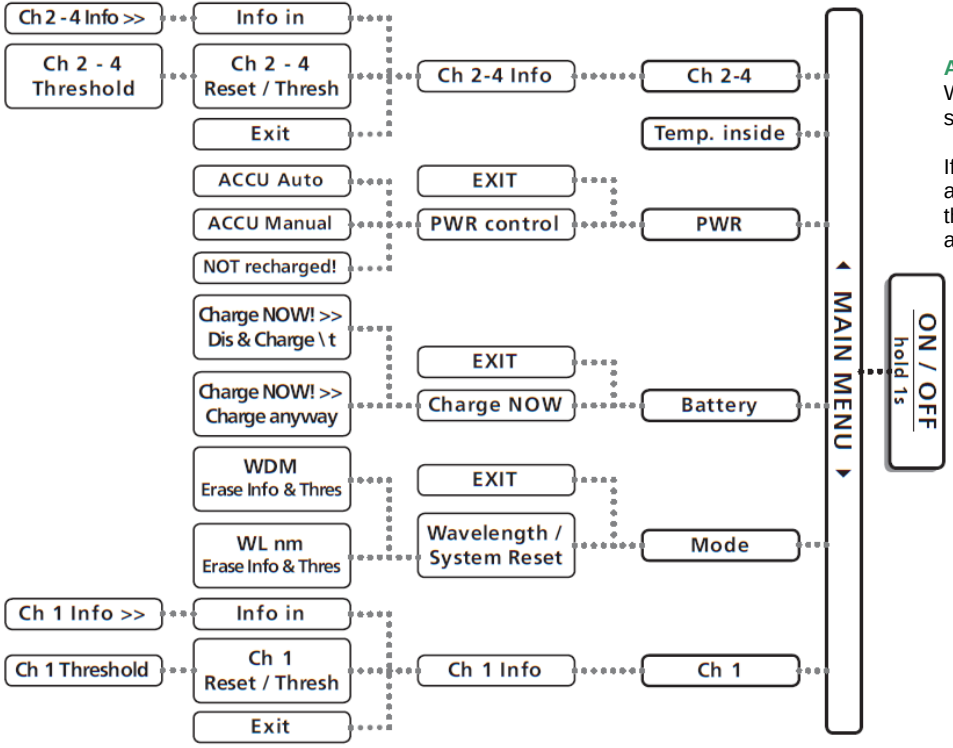
No	Function
10	Fiber input - opticalCON
11	Fiber output - opticalCON or LC
12	Power supply +5V DC

To change the batteries, occur following steps:
- remove safety cable tie
- open cover
- remove battery holder screws
- replace batteries
- close cover and secure with safety cable ties



Before use the powerMONITOR remove safety battery strap.

4. Software Main Menu



Attention: WDM modus at the Wavelength section is only on single-mode available

If the powerMONITOR turns on, an internal test starts and checks the proper functionality of the alarm and LED.

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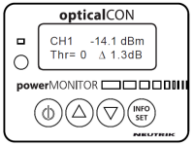
5. Channel Reset / Threshold Selection



1. Select "*Channel Menu*" using △ or ▽.

Ch1 Reset / Thresh

2. To enter "*Ch1 menu*" push INFO SET twice.
   This will reset the relative attenuation.

Ch1 Threshold >>3

3. Select the current threshold level (dB) by pushing △ or ▽ and finally INFO SET to save.

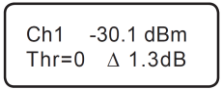
Ch1 -14.1 dBm
Thr=3 Δ 3.3 dB

4. The secondary line indicates the chosen threshold and the relative attenuation (ΔdB)

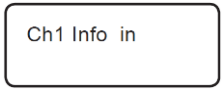
Ch1 -14.1 dBm

Pls. note: To switch OFF the alarm push INFO SET 3 times.

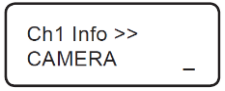
5.1 Change Channel Designation



1. Select "*Channel Menu*" using △ or ▽.
2. To enter "*Ch1 info*" - menu press INFO SET twice.



3. To change the channel designation press △ or ▽ till display indicates "*Ch1 info*" - menu and confirm with INFO SET.

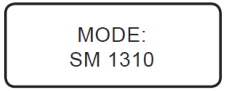


4. Change the displayed symbol by using △ or ▽ and select character with INFO SET.
5. Repeat step 3 and 4 for additional characters.
6. To save move the curser to the right end of the display.

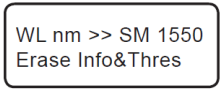
7. Check the entry by pushing INFO SET.
(returns to main info after 10 seconds)

6 Mode - Wavelength Selection (Single-mode)

Set the wavelength depending to your application: 1310 / 1550 nm or WDM for single-mode

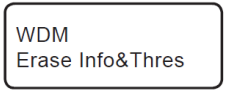


1. Select the "Wavelength Menu" using △ or ▽.
2. Push INFO SET twice to modify the settings.



3. Hit △ or ▽ to switch between the wavelengths and WDM section.

   SM: 1310 / 1550 nm / WDM
   MM: 850 / 1300 nm



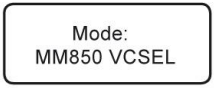
4. Push INFO SET to save the settings. Now the powerMONITOR restarts.

   WDM section works only in single-mode

   Pls. note: A modification of the wavelength selection will reset all settings to factory default.

6.1 Mode - Wavelength Selection (Multimode)

Set the settings according your used wavelength and type of light source (LED, VCSEL)



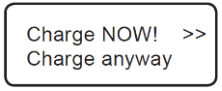
1. Select the "Wavelength Menu" using △ or ▽.
2. Push INFO SET twice to modify the settings.
3. Hit △ or ▽ to switch between following wavelengths and type of light source.

Symbol	Description
MM850 LED	850 nm, multimode, LED light source
MM850 VCSEL	850 nm, multimode, VCSEL light source
SM1300 LED	1300 nm, multimode, LED light source
SM 1300 VCSEL	1300 nm, multimode, VCSEL light source

4. Push INFO SET to save the settings. Now the powerMONITOR restarts.

7 Battery Status / Instant Charging

1. Select "Battery Menu" using △ or ▽.
2. Press INFO SET.

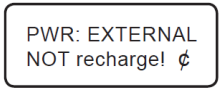


3. Press △ or ▽ to switch between the two charging modes.
4. To set a mode press INFO SET.

Mode	Function
Dis - Charge \ &	Discharges battery before recharging (gently)
Charge anyway т	Starts battery charging immediately

Attention: To charge batteries connect the external power supply (NOPS-1RU-PM)!

8 Power Control Selection

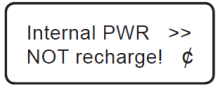


1. Press △ or ▽ till the "*power control*" - menu is displayed.

   If there is an external power supply plugged in, the first line of the display indicates *EXTERNAL*.

   The second line shows the current battery mode.

2. Hit INFO SET.



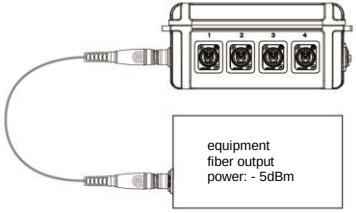
3. To switch between the battery mode press △ or ▽ and confirm with INFO SET

Mode	Function
ACCU Auto \ & ᴛ	Depending on the battery status the power-MONITOR starts to discharge/charge automatically (gently). Only works with rechargeable batteries.
ACCU Manual ᴛ	Without checking the battery status, it starts immedidately to charge.
NOT recharge! ¢	No charging.

Attention: The battery can only be charged by using an external power supply! (NOPS-1RU-PM)

9 Appendix - Application

a) System monitoring with known output power



The powerMONITOR measures the deviation of the signal power at the end of the system as reference to the typical fiber output power from the light source (e.g. DVI converter, SFP transceiver, etc.) according the device specifications.
At the example on top the powerMONITOR exhibits -6 dBm which means 1 dB attenuation in reference to the output power of -5 dBm.

Fiber output power	I -5 dBm I
- Current power (absolute value):	I -6 dBm I

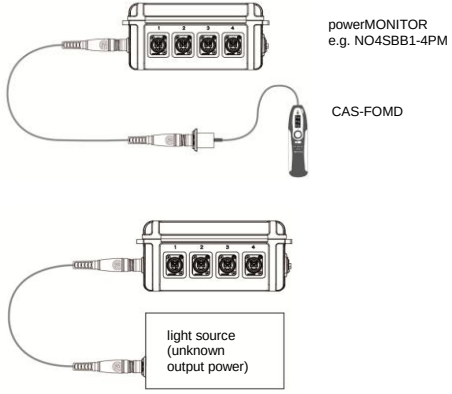
System Attenuation (relative value ΔdB): 1 dB

The following matrix exhibits the attenuation accuracy tolerances of absolute and relative values from the powerMONITOR.

Fiber Type	Absolute Value [dBm]	Relative Value [ΔdB]
Single-mode	0.5	0.1
Multimode VCSEL	1.0	0.5
Multimode LED	1.0	0.5

... Appendix - Application

b) System monitoring with unknown output power



Fiber Type	Attenuation Range
single-mode	-9 dB
multimode	-7 dB

Example:

Attenuation Range: I -9 dB I
System Attenuation: I -5 dB I

Threshold Level: 4 dB

To determine the attenuation of a system, connect a light source as e.g. Neutriks measurement KIT (CAS-FOMD[1]) with help of a LC patchcable and the used opticalCON cable (e.g. NKO4S-R-0-50[1]) and powerMONITOR
(e.g. NO4SBB1-4PM).

The light source offers a typical output power of -3 dBm (2kHz mode). The difference of the output power (Δd**B**) is the total attenuation of the system (cable + devices).

The difference between the recent power budget and the system attenuation shows the corresponding threshold level.
After connect the device (transceiver, DVI-converter, etc.) with the powerMONITOR.

Set the threshold from the powerMONITOR according the calculated value (see example below).

If no power budget is known use typical attenuation values from the table on the left.

[1]...not included

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