



# opticalCON | powerMONITOR User Manual



**NEUTRIK®**

version 2.1

# opticalCON powerMONITOR

## User Manual

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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.



# opticalCON powerMONITOR

## 1. Warning & Important Notice

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This equipment is intended for use in professional applications, where adequate safety mechanisms are being implemented. Review the following safety precautions to avoid injury and prevent damage.



### CAUTION: Dispose

Production of this product required the extraction and use of natural resources. The equipment may contain substances that could be harmful to the environment or human health if improperly handled at the product's end of life. In order to avoid release of such substances into the environment and to reduce the use of natural resource, we encourage you to recycle this product in an appropriate system that will ensure that most of the materials are reused or recycled appropriately.



### CAUTION: Transport

For transportation protect powerMONITOR from rain and handle it carefully.



### CAUTION: Voltage

Use dedicated power adapter: Before connecting make sure that voltage rating and polarity is correct



### 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: 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

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## 2. Specifications

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Power supply:	5V DC external
Rechargeable batteries:	2x 1.5V AA
Battery lifetime:	72 h
Max. current:	250 mA
Power adapter:	110 VAC – 220VAC
Temperature range:	0°C – 70°C
Housing:	steel, gal/black painted
Connectivity:	opticalCON; LC
Return loss:	> 50 dB
Insertion 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 $\mu$ m multimode: 50/125 $\mu$ m
Protection class:	IP 40
Vibration:	IEC 60068
Shock:	IEC 60068
Signal smoothing:	1s
FCC:	FCC / 47CFR Part 5 (Subpart B, Class B, digital Device)

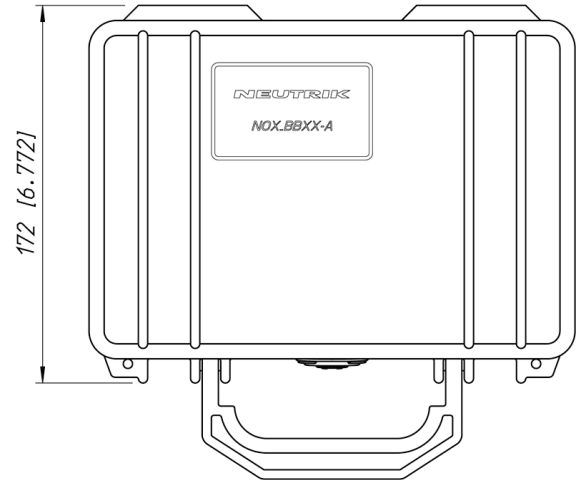
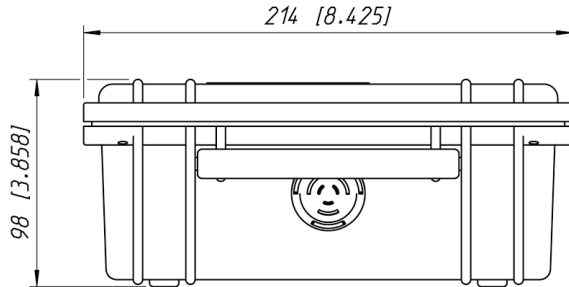


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## 3. Design & Dimensions

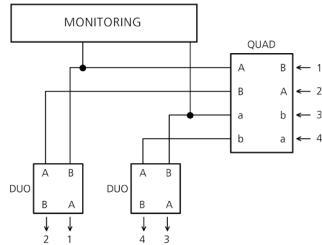
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Dimensions [mm / inch]



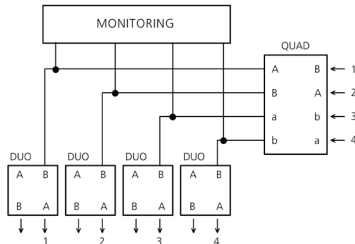
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## 4 Fiber Wiring



2 fiber channels on port B are constantly monitored. Other 2 channels are connected straight through to each opticalCON DUO chassis.

Effected Products: NO4SBB2D-PM-A  
NO4SABB2D-PM-A  
NO4MBB2D-PM-A



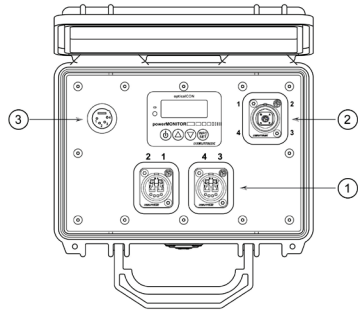
4 fiber channels are constantly monitored. Each single channel is connected to position B of the opticalCON DUO chassis.

Effected Products: NO4SBB4D-PM-A  
NO4SABB4D-PM-A  
NO4MBB4D-PM-A

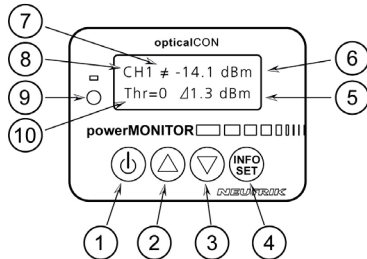


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## 5. Keys & Connectors



No	Function
1	Fiber output - opticalCON
2	Fiber input - opticalCON
3	External power supply - (5V DC)



No	Function
1	Power ON / OFF button
2	UP button ▲
3	Down button ▼
4	INFO / SET button
5	Relative attenuation
6	Absolute attenuation
7	Charging character
8	Chosen channel
9	Alarm LED (red light)
10	Threshold level





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## 6. Getting Started

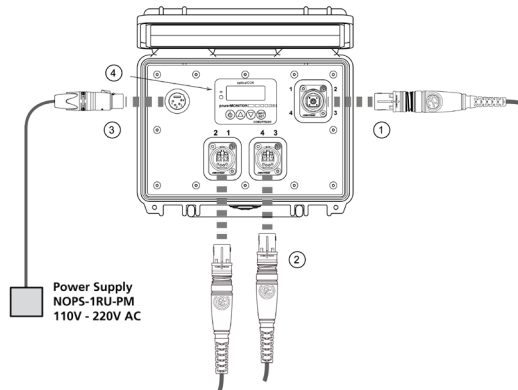
Connect the opticalCON cable of the source (e.g. DVI extender, CCU, etc.) to the input port and the opticalCON cable of the load (e.g. camera, stage box, video wall, etc.) to the output port.

If required plug the external power supply NOPS-1RU-PM to the power socket. Optionally the breakout box can be powered with internal rechargeable batteries (included).



### Attention:

Charge battery for initial operation

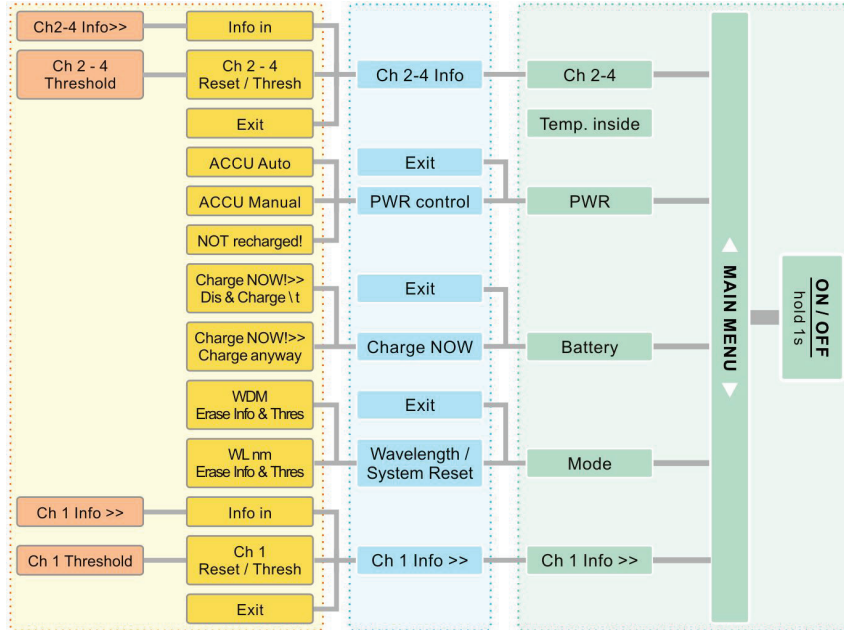


No	Function
1	Fiber input - opticalCON
2	Fiber output - opticalCON or LC
3	Power supply +5V DC
4	Monitoring unit



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## 7. Software Menu Structure



### Attention:

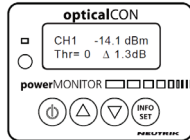
The WDM modus in the Wavelength section is available only in single-mode operation.

When the powerMONITOR is turned on, an internal test starts and checks the proper functionality of the alarm and LED.

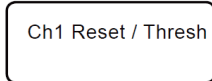


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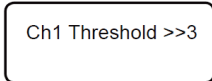
## 8. Channel Reset / Threshold Selection



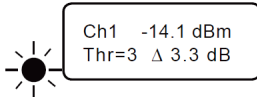
1. Select "Channel Menu" using or .



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



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



4. The lower line indicates the chosen threshold and the relative attenuation ( $\Delta$ dB)



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



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## 8.1 Change Channel Designation











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Ch1 -30.1 dBm  
Thr=0 Δ 1.3dB

Ch1 Info in

Ch1 Info >>  
CAMERA \_

Ch1 info:  
CAMERA

1. Select "*Channel Menu*" using  or .
2. To enter "*Ch1 info*" - menu press  twice.
3. To change the channel designation press  or  till display indicates "*Ch1 info*" - menu and confirm with .
4. Change the displayed symbol by using  or  and select character with .
5. Repeat step 3 and 4 for additional characters.
6. To save move the cursor to the right end of the display.
7. Check the entry by pushing  (returns to main info after 10 seconds)





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## 9. Mode - Wavelength Selection (Single-mode)

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

MODE:  
SM 1310

1. Select the "Wavelength Menu" using  or .


2. Push  twice to modify the settings.

WL nm >> SM 1550  
Erase Info&Thres

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

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

WDM  
Erase Info&Thres

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

WDM section only works in single-mode Operations.

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



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## 9.1 Mode - Wavelength Selection (Multimode)

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Adjust the settings according to the used wavelength and type of light source (LED, VCSEL)

Mode:  
MM850 VCSEL

WL >> MM850 VCSEL  
Erase Info & Thres

1. Select the "Wavelength Menu" using  or .
2. Push  twice to modify the settings.
3. Hit  or  to switch between the following wavelengths and types 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  to save the settings. Now the powerMONITOR restarts.









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## 10 Battery Status / Instant Charging

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Battery: 2.61 V  
↑! □□□□

Charge NOW! >>  
Charge anyway τ

1. Select "Battery Menu" using  or .
2. Press .
3. Press  or  to switch between the two charging modes.
4. To set a mode press .

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



**Attention:**



If the battery status is undercutting a defined voltage level, an alarm sounds.



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## 11 Power Control Selection




PWR: EXTERNAL  
NOT recharge! ⚡

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 .

3. To switch between the battery mode press  or  and confirm with .

Internal PWR >>  
NOT recharge! ⚡

Mode	Function
ACCU Auto \ & τ	Depending on the battery status the powerMONITOR starts to discharge/charge automatically (gently). Only works with rechargeable batteries.
ACCU Manual τ	Charging starts immediately without checking the battery status.
NOT recharge! ⚡	No charging.



### Attention:

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

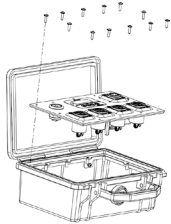




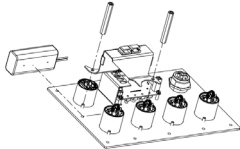
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## 12 Appendix – Change Rechargeable Batteries

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1. Remove 12 screws with a hex key and take out the metal plate



2. Untighten the distance bolt and replace the rechargeable battery (2x1.5V AA).



3. Attach the metal plate by tightening the 12 screws.



**Attention:**

Do not jam the fibers or damage the print circuit board (PCB).

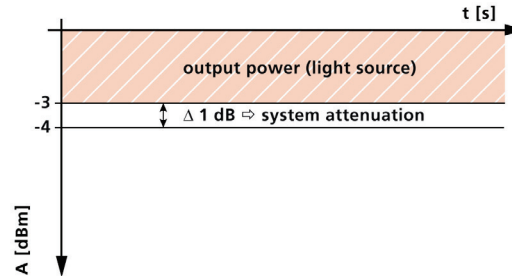
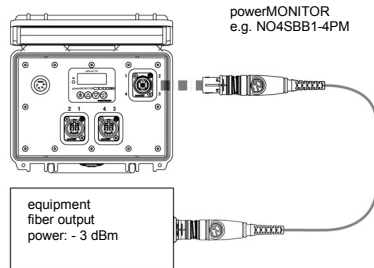
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## 12.1 Appendix System Monitoring

### 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 to the device specifications.

At the example below a light source with constant output power (-3dBm) is connected with an opticalCON cable to the powerMONITOR. The monitor unit shows a received power on -4 dBm which means the deviation  $\Delta$  is 1 dB in reference to the output power of -3 dBm. The relative deviation is the system attenuation caused by the opticalCON cable on this example.



Fiber output power | -3 dBm |  
- Received power (absolute value): | -4 dBm |

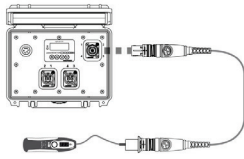
**System attenuation (relative value  $\Delta$ dB) : 1 dB**

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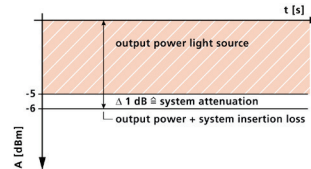
## ... Appendix – System Monitoring

### b) System monitoring with unknown output power

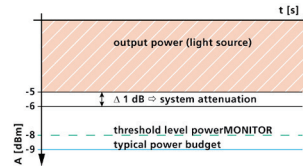
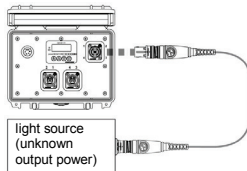
To determine the attenuation of a system, connect a light source with defined output power like Neutrik's measurement KIT (CAS-FOMD<sup>1</sup>) with help of a LC patch cable and the used opticalCON cable (e.g. NKO4S-R-0-50<sup>1</sup>) and powerMONITOR. In the example below the output power from the light source is -5dBm. The powerMONITOR shows on the display -6 dBm which is a 1 dB insertion loss ( $\Delta$ ).



CAS-FOMD



Second connect the light source with unknown output power with the powerMONITOR. The measured values are the output power reduced through the system insertion loss from the opticalCON cable.



Set the threshold level according the known power budgeted from the system. Consider that insertion loss caused by cable bending and fiber contamination requires additional headroom to the power budget limit. If no power budget is known use typical attenuation values from the table below

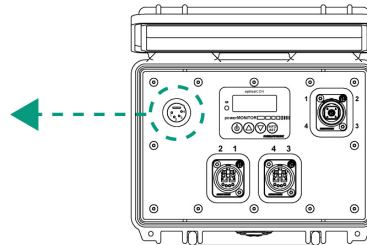
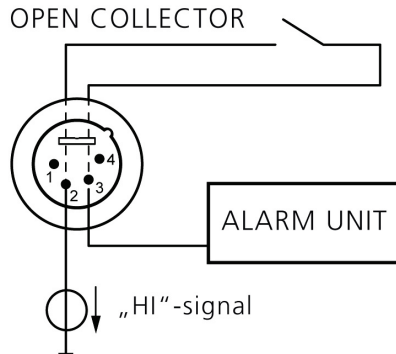
Fiber Type	Single-mode	Multimode
Power budget	-9 dB	-7 dB

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## 12.2 Appendix – External Alarm Signal

With help of a custom cable (not included) there is the option to connect an external alarm unit (e.g. lamp) with the powerMONITOR. Pin 2 and 3 from the power supply (see section 5) are connected to an internal, normally open solid state relay. If the alarm starts the relay closes the internal circuit and the signal from pin 2 reaches the output pin 3.

Relay parameter	Value
Max. voltage	30 Vp
Max. current	1.2 Adc



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## 13 Warranty

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Neutrik AG warrants that the product will be free from defects in materials and workmanship for a period of 2 years from the date of original purchase from an authorized Neutrik distributor. If the product proves defective during this warranty period, Neutrik AG, at its option, either will repair the defective product without charge for parts and labour, or will provide a replacement in exchange for the defective product. Parts, modules and replacement products used by Neutrik AG for warranty work may be new or reconditioned to like new performance. All replaced parts, modules and products become the property of Neutrik AG.

In order to obtain service under this warranty, Customer must notify Neutrik AG of the defect before the expiration of the warranty period and make suitable arrangements for the performance of service. Customer shall be responsible for packaging and shipping the defective product to the headquarters. This warranty shall not apply to any defect, failure or damage caused by improper use or improper or inadequate maintenance and care. Neutrik AG shall not be obligated to furnish service under this warranty a) to repair damage resulting from attempts by personnel other than Neutrik AG representatives to install, repair or service the product; b) to repair damage resulting from improper use or connection to incompatible equipment; c) to repair any damage or malfunction caused by the use of non - Neutrik AG supplies; or d) to service a product that has been modified or integrated with other products when the effect of such modification or integration increases the time or difficulty of servicing the product.

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#### Liechtenstein (Headquarters)

NEUTRIK AG, Im alten Riet 143, 9494 Schaan  
T +423 237 24 24, F +423 232 53 93  
neutrik@neutrik.com

#### France

Neutrik France SARL, Rue du Parchamp 13, 92100  
Boulogne-Billancourt  
T +33 1 41 31 67 50, info@neutrik.fr

#### Hong Kong

Neutrik Hong Kong LTD., Suite 18, 7th Floor Shatin  
Galleria  
Fotan, Shatin  
T +852 2687 6055, neutrik@neutrik.com.hk

#### Associated companies:

#### Germany /Netherlands / Denmark / Austria

Neutrik Vertriebs GmbH, Felix-Wankel-Strasse 1, 85221  
Dachau, Germany  
T +49 8131 28 08 90, info@neutrik.de

#### USA

Neutrik USA Inc., 4115 Taggart Creek Road, Charlotte,  
North Carolina, 28208  
T +1 704 972 30 50, info@neutrikusa.com

#### China

Ningbo Neutrik Trading Co., Ltd., Shiqi Street, Yinxian  
Road West  
Fengjia Villiage, Yinzhou Area, Ningbo, Zhejiang, 315153  
T +86 574 88250488 800, neutrik@neutrik.com.cn

#### Contrik AG

Steinackerstrasse 35, 8902 Urdorf, Switzerland  
T +41 44 736 50 10, contrik@contrik.ch

#### Great Britain

Neutrik (UK) Ltd., Westridge Business Park, Cothey Way  
Ryde, Isle of Wight PO33 1 QT  
T +44 1983 811 441, sales@neutrik.co.uk

#### Japan

Neutrik Limited, Yusen-Higashinonbashi-Ekimae  
Bldg., 3-7-19  
Higashinonbashi, Chuo-ku, Tokyo 103  
T +81 3 3663 47 33, mail@neutrik.co.jp

#### India

Neutrik India Pvt. Ltd., Level 3, Neo Vikram, New Link  
Road,  
Above Audi Show Room, Andheri West, Mumbai,  
400058  
T +91 982 05 43 424, anlesaria@neutrik.com

#### H. Adam GmbH

Felix-Wankel-Straße 1, 85221 Dachau, Germany  
T +49 08131 28 08-0, info@adam-gmbh.de



[www.neutrik.com](http://www.neutrik.com)  
[www.experience-neutrik.com](http://www.experience-neutrik.com)