



PM-800N

Optical Power Meter



User Manual

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1. General Provisions

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2. Introduction

The PM-800N **optical power meter** is designed for measuring the absolute or relative level of optical signal in optical networks or fiber optic systems.

The device is easy to operate and its functions ideal for field measurements. It should be in the equipment of every technician who deals with the construction or maintenance of optical routes. AWD (Auto Wavelength Detection) simplifies instrument setup and eliminates operator errors.

Operation is provided by rechargeable batteries with a minimum lifespan of 5 years. Batteries can be charged using a standard USB port or an external USB adapter. Charging is controlled by a microprocessor, which guarantees optimal charging and extends battery life.

The instrument's internal memory allows up to 3000 measurements to be stored and organized in two levels, including memory position or fiber number, wavelength, absolute value, or attenuation value. The stored data can be easily transferred to a PC as a text file using the "Hyperterminal" and further processed (Excel, Word). It is also possible to use SmartProtocol – PC software – to download data and create measurement reports.

The device can be used separately to measure the absolute or relative value of the optical signal in optical networks or in cooperation with the LS-800N optical signal source to measure the optical attenuation of SM or MM fibers at up to 6 wavelengths.

3. Properties

- Small size, light weight
- InGaAs or Si photodetector
- More than 20 working wavelengths
- Measurement of SM and MM applications
- CW measurement and detection of modulated signal 270 Hz, 1 kHz, 2 kHz
- AWD function - Automatic wavelength detection
- Memory for 3000 measured values in two levels: Cable, Fiber
- USB-C port - control, firmware upgrade, data transfer to PC, charging
- Units Shown: dBm, dB, W
- Powered by Li-Pol battery
- Auto Off function, battery status indicator
- Simple menu structure

4. Application

- Measurement of absolute or relative level of optical signal, measurement of optical networks
- Measurement of output/input level of optical transceivers
- Attenuation measurement of optical fibers, connectors, splices and other components in cooperation with the LS-800/LS-800N optical radiation source
- Easy identification of faults in optical networks
- SM or MM applications

5. Accessories

Standard

- Instrument
- Rechargeable Li-Pol battery
- Connector adapter kit:
 - Universal 2.5 mm
 - FC, SC LC connector connector
- External USB charging adapter
- Calibration certificate, warranty card
- Program SmartProtocol
- USB-C cable
- Transport case (TE-HC-03)



TE-HC-03



USB power adapter

Optional

- WiFi module
- Bluetooth module
- Universal input adapter 1.25 mm
- Master measuring patchcord
- Master adapter

6. Technical specifications

	PM-800N	PM-800N-SI	Notes:
Photodetector	1 mm InGaAs	3.6 mm Si	
Working wavelengths	CWDM: 1270,1290,1310,1330,1350, 1370,1390,1410,1430,1450,1470,1490 1510,1530,1550,1570,1590,1610 nm Next: 850,980,1300,1383,1625 nm	635, 650, 850, 880, 910, 940. 980 nm	1383 nm – Water Peak
Dynamic Range	-60 dBm to +10 dBm-53 dBm to +15 dBm	-40 to +10 dBm	CWDM, 1300, 1383, 1625 nm 850, 980 nm
Uncertainty	± 5%		1310, 1550 nm @ -20dBm
Resolution	0.01		
Dimensions	165 x 80 x 40 mm		With universal 2.5 mm adapter
Weight	250 g		
Temperature Humidity (non- condensing)	operating: -10 to +50 °C; storage: -40 to +70 °C 0 – 95%		
Battery life	> 75 hours		Between charges

7. Safety instructions

The PM-800N itself does not emit any optical radiation and is not dangerous for the operator. Before operating the device, make sure that the device is not damaged and follow the following recommendations and warnings.

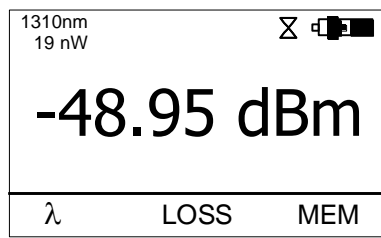
- Installation, service and commissioning of high-level equipment is only permitted to properly trained and knowledgeable persons.
- Only insert standard optical connectors into the device – otherwise internal components may be damaged.
- All optical connectors used must be clean; when cleaning, follow the appropriate instructions for each connector (see chapter 7.3 Best practices for cleaning and splicing optical connectors).
- Never use a microscope to inspect the front of the connector without making sure that the connector emits some optical radiation.
- To maintain safety, only use a microscope that is equipped with an infrared filter.
- Never look directly into the connector or optical fiber during measurement, testing, or maintenance of fiber optic systems. Infrared radiation can permanently damage your eyesight.
- Avoid direct exposure to the optical signal.

8. Maintenance

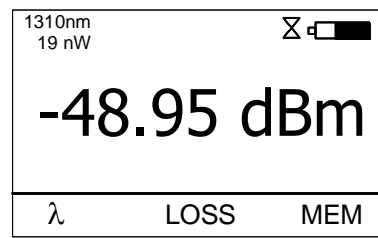
8.1. Battery

The PM-800N is powered by a built-in Li-Pol battery.

- Use the USB port (PC) or an external USB charging adapter (standard accessory) to charge the batteries.
- Before using the device for the first time, fully charge the inserted battery.
- For charging, only use the USB charging adapter supplied with the device.
- We do not recommend charging batteries before the battery capacity indicator shows less than 30%. The recommended charging time for the batteries is 12 to 14 hours.
- If the PM-800N will be stored for a long time, please charge the battery to 80% before storing it. Batteries are discharged during storage.
- When the PM-800N is not used for a long time, please check the battery at least every 6 months.
- Batteries are consumables. Recharging and discharging shortens their lifespan.



Battery charging



Battery is discharging

8.2. Instrument

- Store and transport the device in the transport case.
- If possible, do not use the device in strong sunlight.
- Clean the plastic parts of the device with common cleaning agents. Acetone or other active agents may damage the device.
- The device is protected against dust and water, but is not waterproof. If moisture gets into the appliance, dry it thoroughly before using it again.

8.3. Recommended cleaning and mating instructions

Cleanness greatly increases the performance of the optical system. We recommend the following cleaning procedure before installation. Clean optical connectors, adapters, attenuators, or terminators before any installation or connection. We recommend using the following tools for cleaning, which should be included in every assembly and cleaning kit:

- Lint-free laboratory wipes
- Isopropyl alcohol container
- Lint free pipe cleaners
- Clean, dry, oil-free compressed air

8.3.1. Cleaning

Connectors, terminators

1. Fold clean, new wipe into a 5x5 cm square pad.
2. Moisten, but do not saturate, the pad with alcohol making a spot approximately 1/2" in diameter.
3. Open the connector protective cover (LSH-E2000).
4. Press the ferrule endface into a wet spot on the wipe. Using force, twist the ferrule so that a hard wiping action takes place. Repeat twice, using a clean alcohol-moistened at each time.
5. Dry the ferrule with the dry end of a wipe.
6. Close the connector cover.

7. Discard the used pad.

Attenuators

1. Clean the connector in the same way (see above) and blow the other end dry with clean compressed air.
2. Clean bulkhead attenuators only by blowing with clean compressed air.

Adapters

1. Moisten one end of a cotton swab in isopropyl alcohol.
2. Wipe off excess isopropyl alcohol.
3. Properly wipe and clean the adapter from both ends.
4. Wipe the adapter with the other dry end of the stick.
5. Blow out the coupling with compressed air.

8.3.2. Optical connector connection

SC, MT-RJ, LC

1. Align the connector body key with the coupling groove.
2. Push the connector into the coupling until an audible click of the mating system.

FC

1. Insert the ferrule into the coupling.
2. Align the connector body key with the coupling groove.
3. Push the connector into the connector as far as their bodies will go.
4. Screw the union nut of the connector onto the coupling.

LSH (E2000)

1. Align the slots with the key on adapter.
2. Insert the connector into the adapter until it clicks into place.

ST

1. Align the ferrule key with the coupling groove.
2. Insert the connector into the adapter until the two ferrules touch.
3. Align the groove of the connector bayonet with the pin of the connector body.
4. Twist to close the bayonet joint properly.

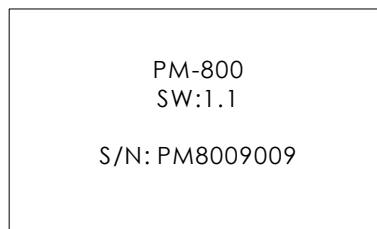
WARNING: Infrared radiation is invisible and can seriously damage the retina of the eye. Do not look directly into any optical fiber!

9. Device description, control keys




[ON/OFF]

Turns the key ON/OFF. When turned ON, the display will show the device type, firmware version, and serial number.



When the device is turned OFF, the icons λ and λ are displayed, which you activate by pressing the **[↑]** key below the corresponding icon.



The icon  turns the AUTO OFF function ON and OFF. If this function is switched ON, the device will automatically switch off after ten minutes of inactivity.

The **λ icon** toggles the wavelength selection menu. In this menu, you select which working wavelengths are available while the instrument is running.

[BL]

This key turns the display backlight ON and OFF.



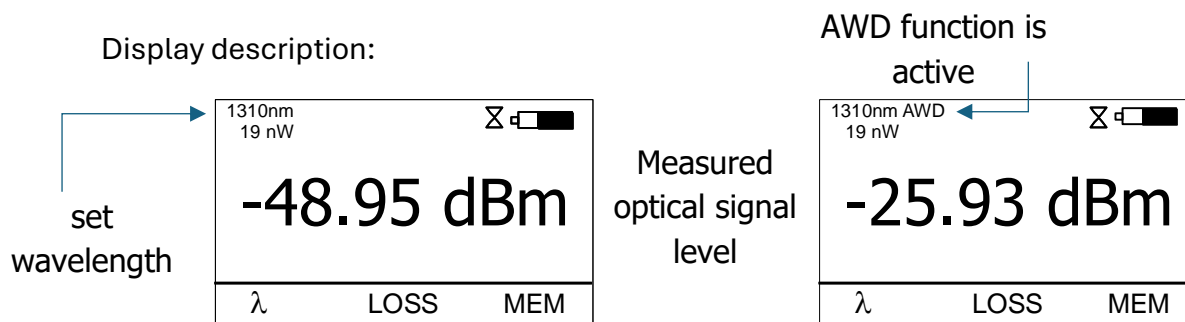
These are contextual keys, their meaning is determined by the labels at the bottom of the display.

9.1. Menu #1 – absolute measurement

In absolute measurement, the absolute value of the level of the optical signal we are measuring - the unit dBm - is shown on the display. At the same time, in the upper left corner, the level of the optical signal in "W" units is displayed.

When the device is turned on and the information above is displayed, the following display will appear on the display.

Display description:



[λ]

Setting the desired wavelength (see point 10, page 22) or AWD mode (automatic wavelength detection).

In the automatic wavelength detection mode, the display will show "AWD".

Note: To use this function, the LS-800N optical radiation source must cooperate with the PM-800N optical power meter.

[LOSS]

Activation of the relative measurement mode (unit "dB").

Displaying the last reference made for the selected wavelength.

Enter menu #2 – relative measurements.

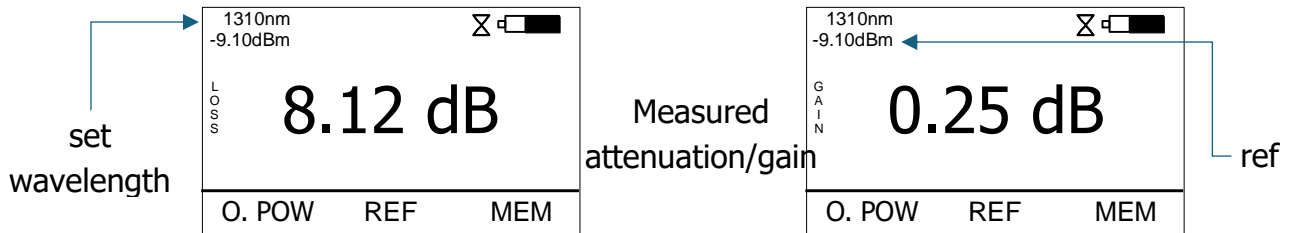
[MEM]

Enter menu #3.Working with internal memory.

9.2. Menu #2 – Relative Measurement

In the case of relative measurement, the display shows the value of optical insertion loss or gain – unit dB, which is linked to the reference made.

Display description:

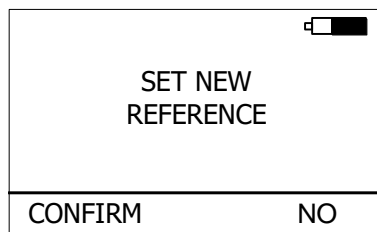


[O.POW]

Return to absolute measurement mode (unit "dBm"). Return to menu #1 - absolute measurement.

[REF]

Setting and saving a reference for the selected wavelength. Note: The new reference must be confirmed on the following display:



[MEM]


Enter menu #3.Working with internal memory.

9.3. Menu #3 – Operation with internal memory

The memory of the PM-800N is structured into two levels. The measured values are stored in the FIBER memory positions and in the CABLE directories, see the figure below.

CABLE001	FIBER001 FIBER002 FIBER003 FIBER004 FIBER005 FIBER006 FIBERXXX
CABLE002	FIBER001 FIBER002 FIBER003 FIBER004 FIBER005 FIBER006 FIBERXXX
.....	
CABLEXXX	FIBER001 FIBER002 FIBER003 FIBER004 FIBER005 FIBER006 FIBERXXX

After pressing the [MEM] key from Menu#1 or Menu#2, the following menu appears.


SAVE RESULT	
→ BROWSE RESULTS	
UPLOAD MEMORY	
ERASE MEMORY	
HOME	
UP	DOWN OK

[UP], [DOWN], [OK]

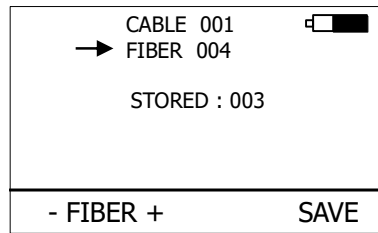
These keys are used to select the appropriate item.

9.3.1. Storage of measured values

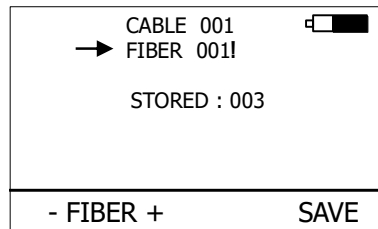
- 1. Use the [UP] and [DOWN] keys to select "SAVE RESULT" and press [OK].

→ CABLE 001	
FIBER 004	
STORED : 003	
- CABLE +	FIBER

2. Use the [- CABLE +] keys to select the directory where you want to save the data. The display shows the number of values already stored in this directory. Next, press the [FIBER] key.



3. The device will offer you the first free FIBER memory slot in the selected CABLE directory.
Save the measured value to this position by pressing the [SAVE] key or change the offered position with the [- FIBER +] keys and save by pressing the [SAVE] key.
Note: If the memory slot is already occupied, the "!" sign is shown on the display.

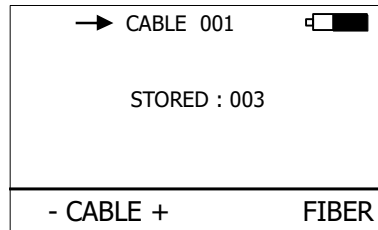


Pressing the [SAVE] key overwrites the previously saved value.

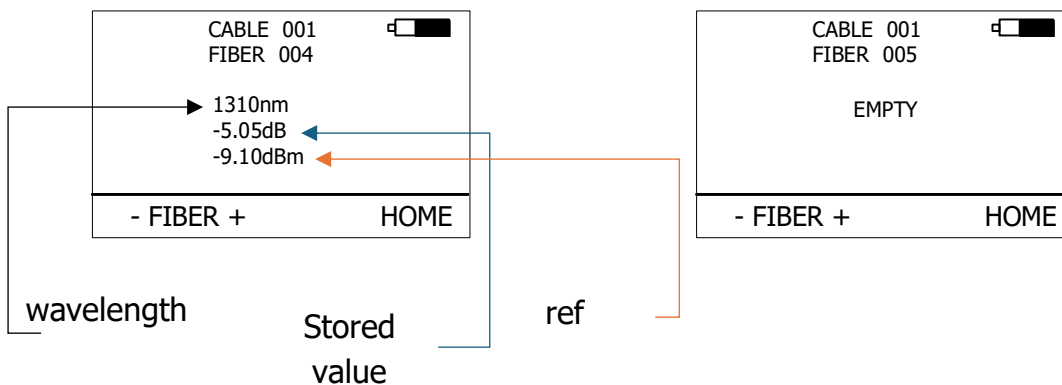
At any time during the measurement value saving, you can exit this menu by briefly pressing the [ON/OFF] key to return to the home screen.

9.3.2. Viewing measured values

1. Use the [UP] and [DOWN] keys to select "BROWSE RESULTS" and press [OK].



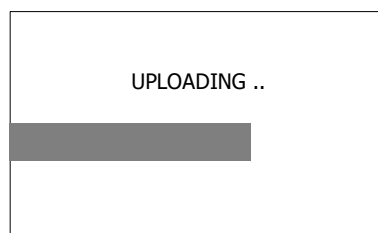
2. Use the [- CABLE +] keys to select the appropriate folder. The display shows the number of stored values in this directory. Next, press the [FIBER] key.



3. Viewing the stored values is possible by using the [- FIBER +] keys.
4. Press the [HOME] key to stop scanning the memory.

9.3.3. Sending memory content to a PC

1. Use the [UP] and [DOWN] keys to select "UPLOAD MEMORY".
2. Press [OK]. The entire contents of the memory are sent to the USB port. For detailed information, refer to chapter 11 Data transfer to PC.



9.3.4. Clearing memory

1. Use the [UP] and [DOWN] keys to select "ERASE MEMORY" and press [OK].



2. Confirm that the memory is cleared by pressing the [CONFIRM] key, press the [NO] key to return to the home screen.

9.3.5. Home

1. Use the [UP] [DOWN] keys to select "HOME".
2. Press the [OK] key to return to the home screen.

10. Insertion loss measurement

10.1. Basic Theory

Insertion loss measures the degradation of the signal in the optical cable. In this process, a light source emits an optical signal of a specific wavelength into the fiber, and the power meter measures the received signal at the same wavelength.

According to EN 61300-3-4, two measurement methods are used:

- **Method C2** – Method with direct connection to the power meter
- **Method C3** – Method with additional test patchcord

Power measurement forms the basis of optical testing, which determines the power budget of an optical link by comparing the power of the transmitter with the sensitivity of the receiver. This difference represents the maximum acceptable loss, influenced by factors such as fiber attenuation, dirty connector surfaces, connector misalignment, loss at fiber weld points, and sharp fiber bends.

The end-to-end loss test is the most common acceptance test of power loss in optical links. This test measures the difference in performance between the input and output of a link. For this test, the PM-800N optical power meter and the LS-800N light source are used, with the LS-800N being the transmitter and the PM-800N the receiver.

The end-to-end test involves two steps:

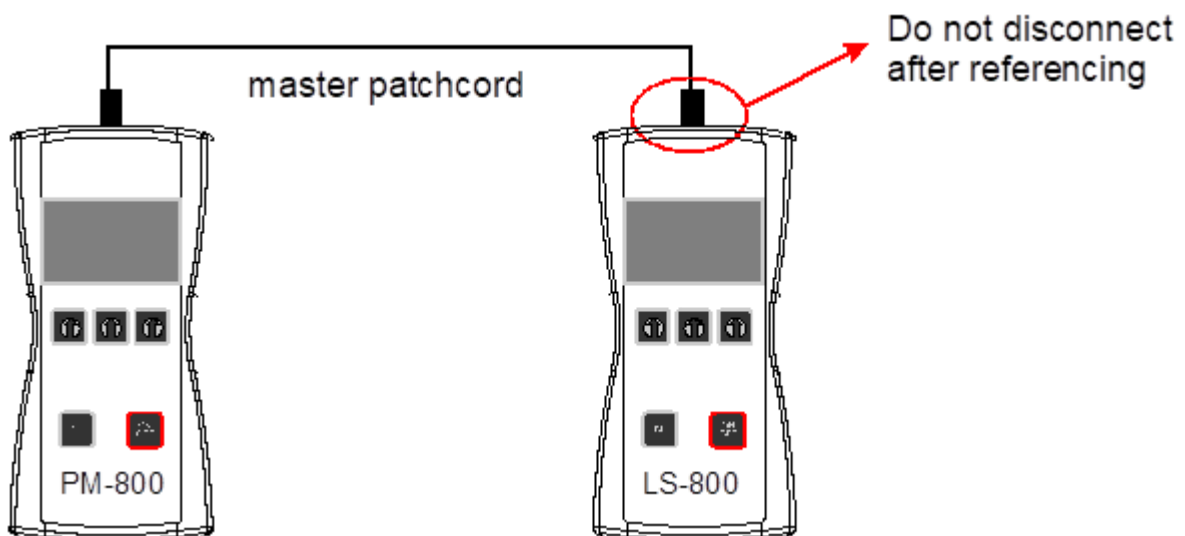
1. Reference Settings
2. Attenuation measurement

10.2. Method C2

In method C2, a single master patch cable with its attenuation set to 0 is used to set the reference.

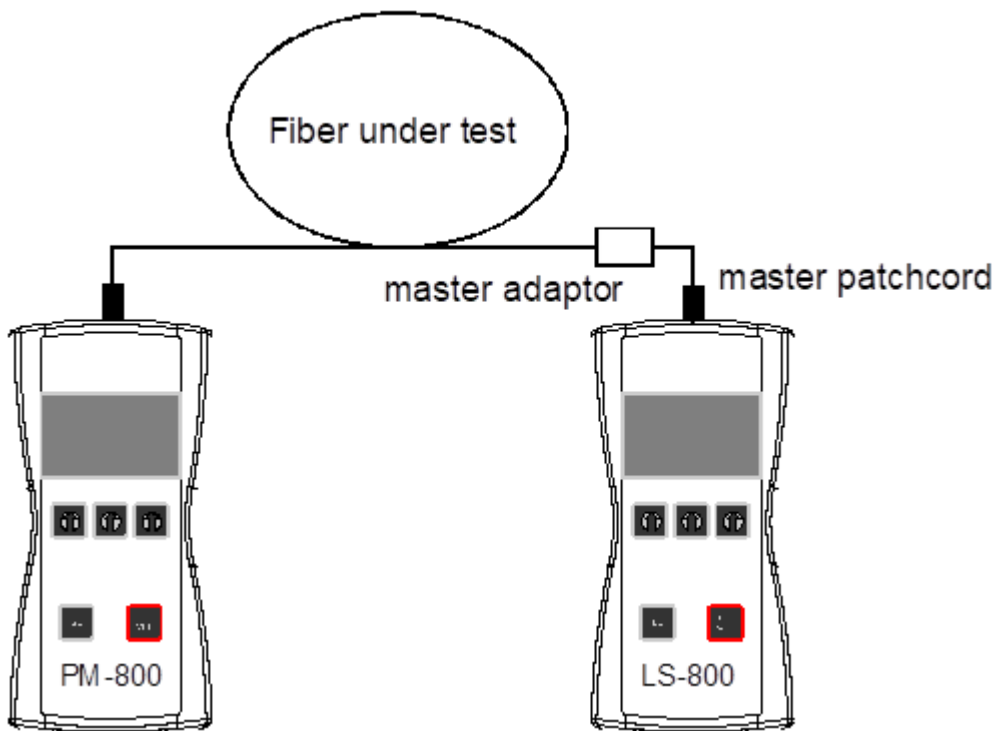
10.2.1. Reference Settings

1. Connect the master patchcord to the PM-800N optical power meter
2. Connect the other end of the master patchcord to the LS-800N optical light source
3. Turn on the source and set the desired wavelength by " λ ."
4. Turn on the meter and set the desired wavelength option " λ ."
5. Press "**REL**" to enter the relative attenuation measurement mode on the meter.
6. Take a reference measurement through the master patchcord by pressing "**REF**," and then "**CONFIRM**."



10.2.2. Attenuation measurement

1. Do not disconnect the masterpatch cord from the source
2. Disconnect the master patchcord from the meter
3. Connect the cable under test (DUT) between the power meter and the master patchcord connected to the light source with a adaptor.
4. The power meter will show the measured attenuation in dB. If the display shows GAIN, it means that the measured path shows gain against the reference.

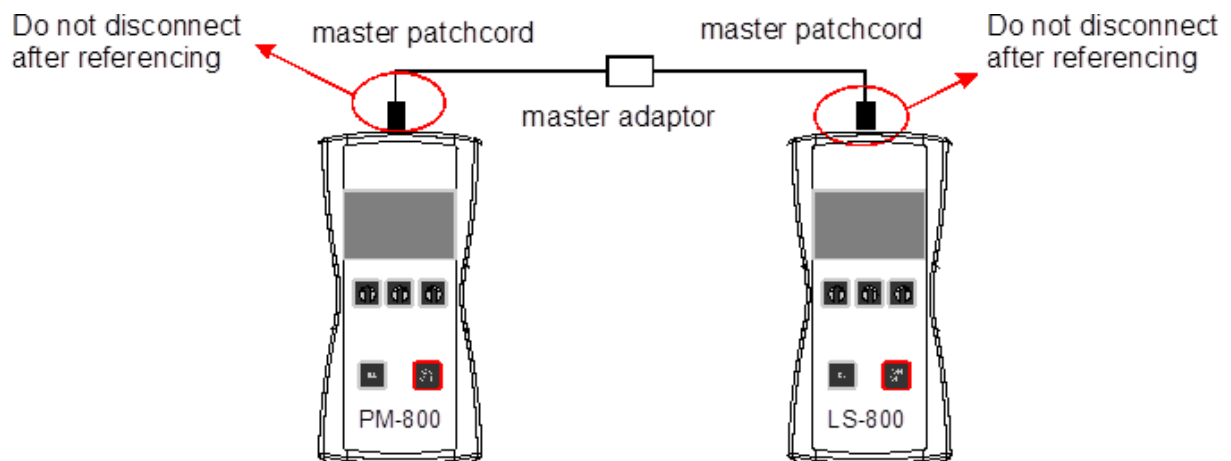


10.3. Method C3

When measuring using the C3 method, two master patchcords are used to set the reference. This method cancels out the effects of the master patchcords and one adapter for all subsequent measurements.

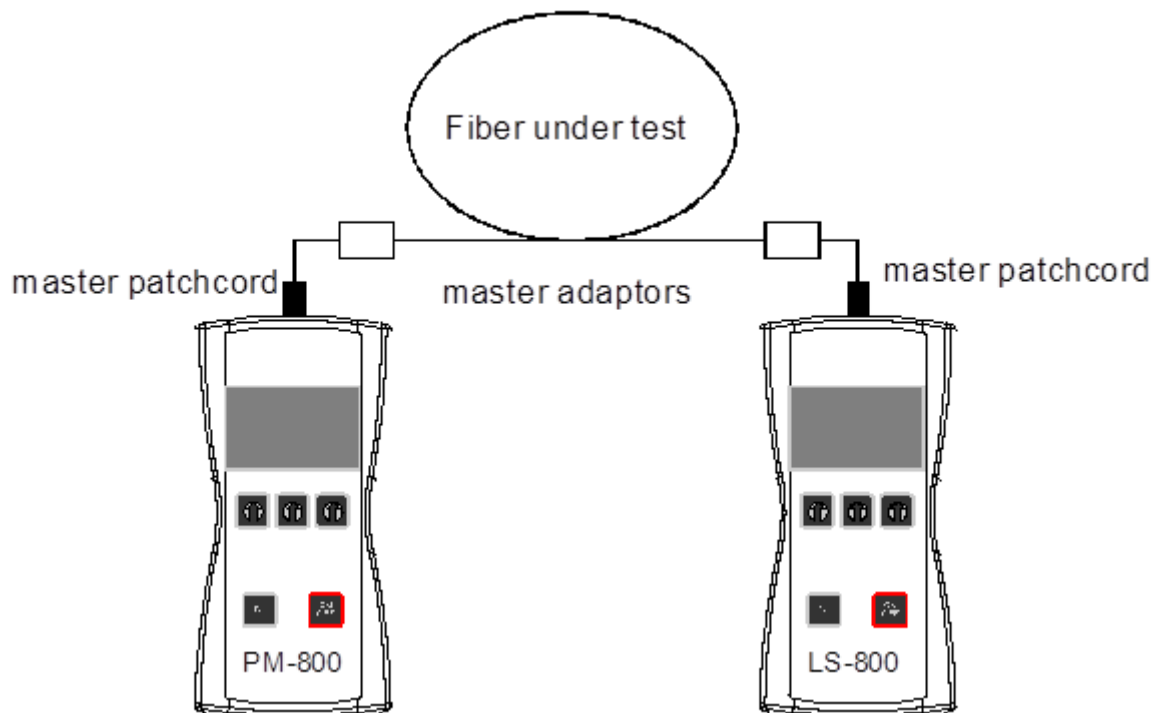
10.3.1. Reference Settings

1. Connect the first master patchcord to the PM-800N meter.
2. Connect the second master patchcord to the LS-800N light source.
3. Connect the patchcords with a measuring adapter.
4. Turn on the source and set the desired wavelength by " λ ."
5. Turn on the meter and set the desired wavelength with " λ ."
6. Press "**REL**" to enter the relative attenuation measurement mode on the meter.
7. Take a reference measurement through the master patchcords by pressing "**REF**," and then "**CONFIRM**."



10.3.2. Attenuation measurement

1. Do not disconnect the master patchcords from the light source and power meter
2. Disconnect the connection of two master patchcords
3. Connect the cable under test (DUT) between the two master patchcords using an additional coupling measuring adapter.
4. The meter will show the measured attenuation in dB. If the display shows GAIN, it means that the measured path shows gain against the reference.



11. Remote control and data transfer

You can control the PM-800N measuring device from a connected PC using the following methods:

1. Using terminal applications (Hyper Terminal, Putty, Tera Term, etc.)
2. With the dedicated OPTOKON app for controlling measuring instruments.

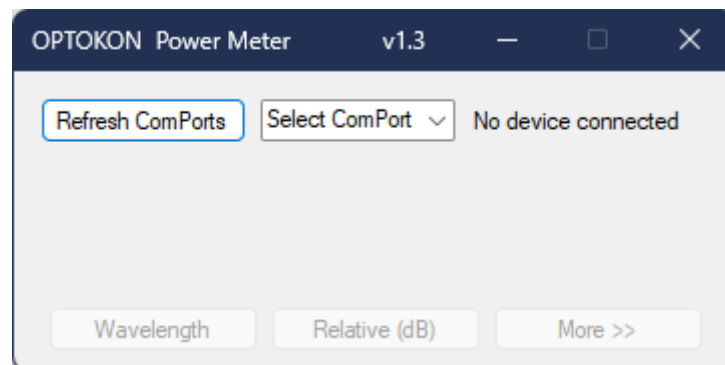
11.1. Terminal application

1. Find out under which COM port the meter reports (e.g. using Device Manager)
2. Launch the terminal applications of your choice
3. Open the connection to the COM port of the device at 19200 baud, 8n1
4. Control the device using the following commands
 - Individual characters, without pressing Enter, do not echo

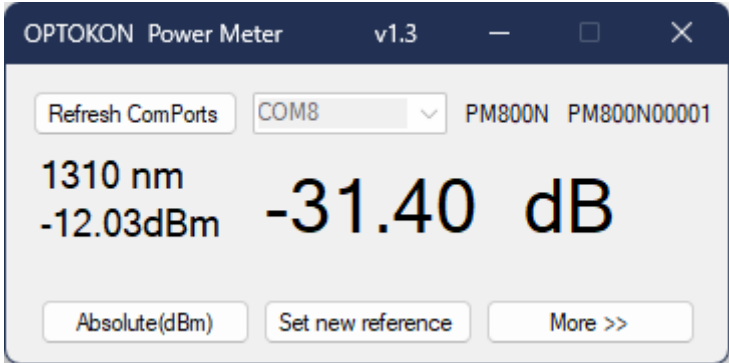
Command	Meaning	Notes
in	Current value on the display	Output to terminal
r	Ref	
l	Current wavelength	
n	Type and serial number	
1	Simulating the first button press	Output to meter display
2	Simulating the second button press	
3	Simulation of pressing the third button	
0	[HOME] Key	Return to menu #1

11.2. Applications for controlling measuring instruments

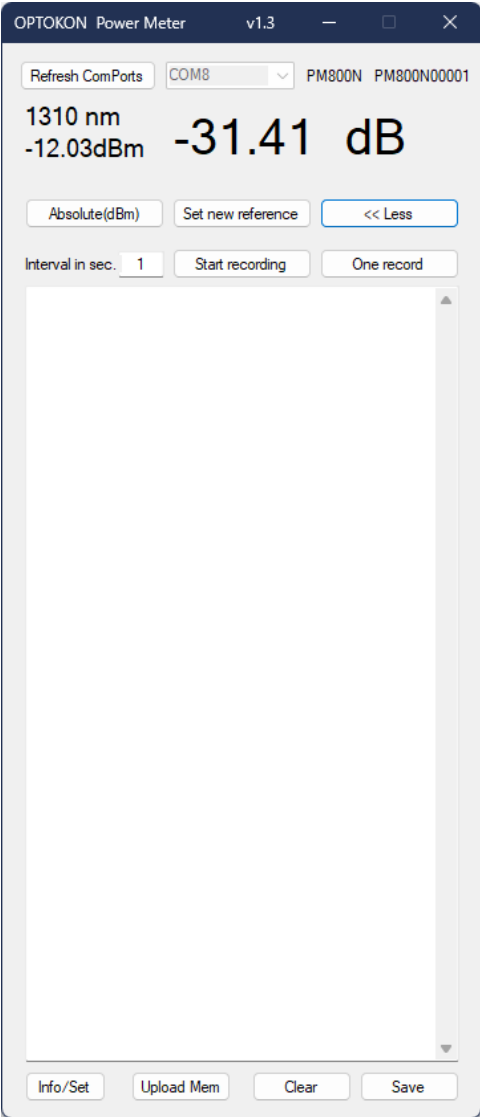
1. Download the app from:
<https://www.optokon.com/clanek/37-stazeni-manualu-a-ovladacu-pro-merici-pristroje> - OPTOKON Power Meter Control Software
2. Connect the power meter to your computer using the included USB cable and launch the app



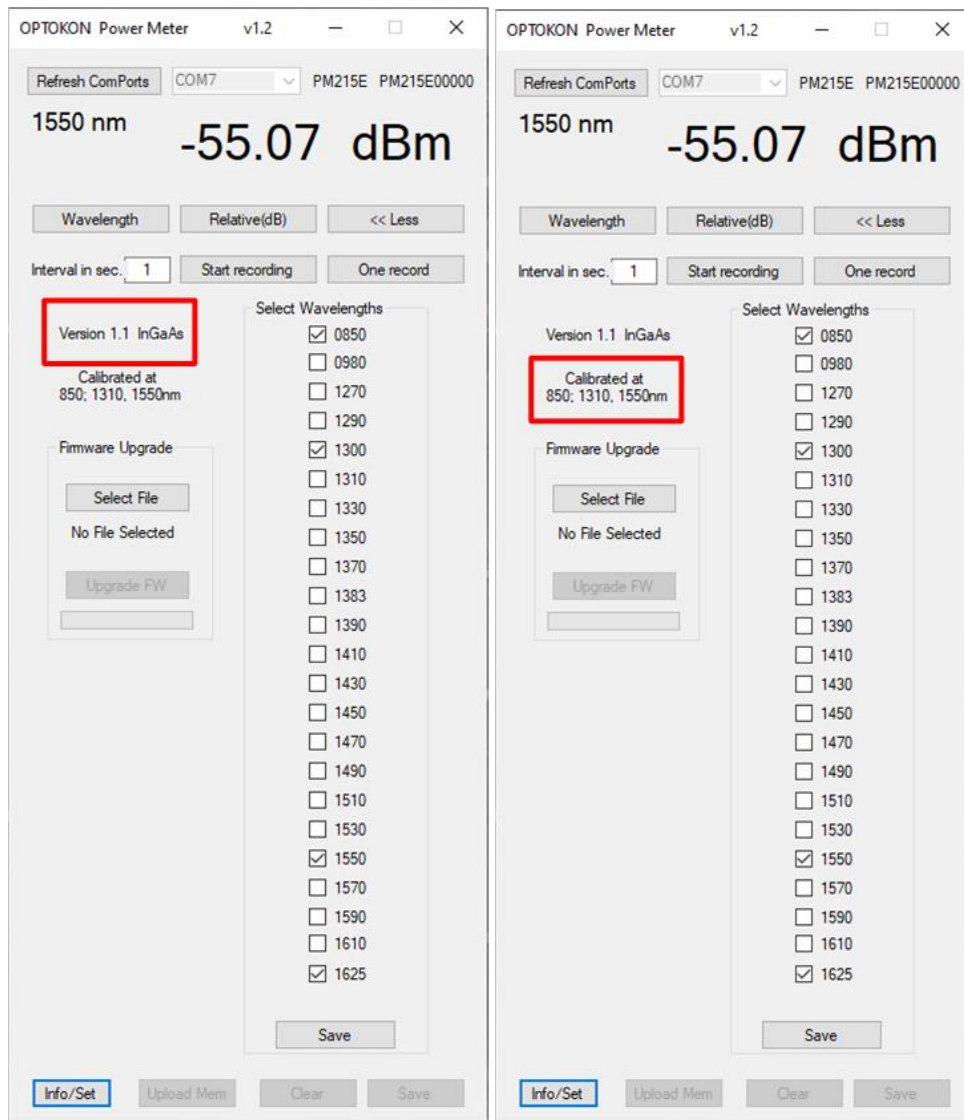
- 3. Select the COM port that the device is connected to, the application connects, displays the device model and serial number, and starts mirroring the device display in the application window



- 4. From the main view, you can cycle between wavelengths, switch between relative and absolute modes, and set reference measurements
- 5. To see more options, click the "More >>" button



6. In this expanded view, you can download data from the device, perform interval measurements, and save the data obtained in this way in text files
7. To change the advanced power meter settings, press the "Info/Set" button



8. The "Info/Set" view displays important information about the device, such as the firmware version and wavelengths to which the device was calibrated
9. You can use the "Firmware upgrade" field to upload new firmware to the device, this is limited to **the official firmware issued by OPTOKON**
10. Use the "Select wavelengths" field to switch which wavelengths from the supported list are displayed in the meter interface, confirm by pressing the "Save" button

12. Contact

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