



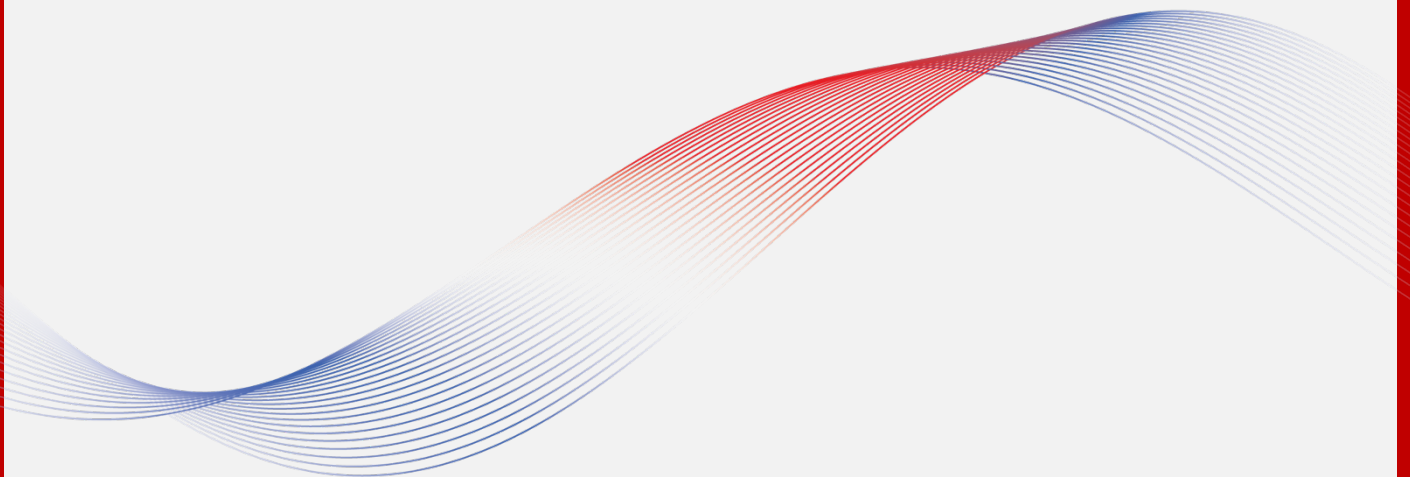
santec

OPM-200

**High Performance
Optical Power Meter**

User Manual

M-OPM-200_1.4



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COMPLIANCE

FDA-CDRH Compliance

Under the US Food and Drug Administration (FDA) Center for Devices and Radiological Health (CDRH), the unit complies with the Code of Federal Regulations (CFR), Title 21, Subchapter J, which pertains to laser safety and labeling. See following link for more information:

- <http://www.accessdata.fda.gov/scripts/cdrh/cfdocs/cfcfr/CFRSearch.cfm?CFRPartFrom=1000&CFRPartTo=1050>

CSA / IEC Compliance

The unit complies with certain standards of the Canadian Standards Association (CSA) and the International Electrotechnical Commission (IEC).

The unit falls in the Installation Category (Overvoltage Category) II under IEC 664. IEC 664 relates to impulse voltage levels and insulation coordination. The category is defined as: local level, appliances, portable equipment, etc., with smaller transient overvoltage than Installation Category (Overvoltage Category) III.

The unit falls in the Pollution Degree 2 category under IEC 1010-1 and CAN/CSA-C22.2 No. 1010.1. The IEC standard on Safety Requirements for Electrical Equipment for Measurement, Control, and Laboratory Use relates to insulation coordination. The CSA standard is on Safety Requirements for Electrical Equipment for Measurement Control, and Laboratory Use, Part I: General Requirements. The Pollution Degree 2 category is defined as follows: “Normally only non-conductive pollution occurs. Occasionally, however, a temporary conductivity caused by condensation must be expected.”

CE Compliance

Electronic test equipment is subject to the EMC Directive in the European Union. The EN61326 standard prescribes both emission and immunity requirements for laboratory, measurement, and control equipment. This unit has undergone extensive testing according to the European Union Directive and Standards.

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GENERAL INFORMATION

OPM-200 High Performance Optical Power Meter Overview

The OPM-200 is designed to provide accurate and precise measurements with a dynamic range of +8 dBm to -80 dBm with the 2 mm InGaAs detector and +30 to -50 dBm with the integrating sphere detector. It is equipped with a variety of features that make it suitable for lab environments, while also being simple and robust for seamless integration into a manufacturing production line. The unit can be configured with up to four detectors, either front panel mounted or remote-head.



Figure 1: OPM-200 High Performance Optical Power Meter

Applications

- Optical alignment
- Transceiver testing
- Amplifier characterization
- Transient testing
- Lab and R&D

Key Features

- High speed
 - 50 μ s averaging
 - 128,000 point data logging per detector
 - Analog bandwidth up to 10 kHz
- Simple to integrate
 - Touch screen or USB/Ethernet

- Simple and intuitive programming
- Input trigger and analog output
- Detector options
 - Remote-head: up to 10m
 - Front panel mounted

Test & Measurement Standards

- NIST traceable
- ISO 17025 calibration

Included Accessories

- USB A to USB B cable (1.5m)
- Ethernet cable (1.5m)
- AC power cord
- SD-CAP slide detector cap

Optional Accessories

- Remote-head detector and remote-head M12 cable (1.5m up to 10m)

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SAFETY INFORMATION

To avoid situations that could result in serious injuries or death, always observe the following precautions.

The safety instructions must be observed whenever the unit is operated, serviced, or repaired. Failure to comply with any of these instructions or with any precaution or warning contained in the user manual is in direct violation of the standards of design, manufacturing, and intended use of the unit. Santec assumes no liability for the customer's failure to comply with any of these safety requirements.

Classification

The OPM-200 consists of an exposed metal chassis that is connected directly to earth via a power cord and is therefore classified as a Class 1 instrument.

Important Safety Information

Laser Hazards

Warning



- Never look directly into the end of an optical cable connected to an optical output device that is operating. Laser radiation is invisible and direct exposure can severely injure the human eye.

Electrical Hazards

Warning



- Some of the circuits are powered whenever the unit is connected to the AC power source (line power). To ensure that all circuits are powered off, disconnect the power cord from either the power inlet on the unit's rear panel or from the AC line-power source (receptacle). The power cord must always be accessible from one of these points. If the unit is installed in a cabinet, the operator must be able to disconnect the unit from the line power by the system's line-power switch.
- Use only the type of power cord supplied with the unit. If you need to replace a lost or damaged cord, make sure to replace with a power cord of the same type.

- Connect the power cord only to a power outlet equipped with a protective earth contact. Never connect to an extension cord or any receptacle that is not equipped with this feature.
- If using a voltage-reducing autotransformer to power the unit, ensure that the common terminal connects to the earthed pole of the power source.
- Do not interrupt the protective earth grounding. Such action can lead to a potential shock hazard that can result in serious personal injury. Do not operate the unit if an interruption to the protective grounding is suspected.
- Do not operate the unit when its cover or panels have been removed.
- To prevent potential fire or shock hazard, do not expose the unit to any source of excessive moisture.
- Do not use the unit outdoor.
- Operating the unit in the presence of flammable gases or fumes is extremely hazardous.
- If the equipment is used in a manner not specified by the manufacturer, the protection provided by the equipment may be impaired. Only technicians authorized by Santec should carry out repairs. In addition to voiding the warranty, opening the unit (even when unplugged) can expose you to potential shock hazards.
- Some of the unit's capacitors can be charged even when the unit is not connected to the power source.
- Do not perform any operating or maintenance procedure that is not described in the user manual.

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GETTING STARTED

Caution



- To avoid injury or death, always observe the precautions listed in SAFETY INFORMATION on page 4.

This manual contains complete operating instructions for safe and effective operation of the OPM-200 High Performance Optical Power Meter. It is recommended that users of the OPM-200 familiarize themselves with contents of this manual before using the instrument.

The inspection report and a description of any customer-requested information may be found in the calibration document envelope included with the instrument.

Initial Inspection

Warning



- To avoid electrical shock, do not initialize or operate the unit if it bears any sign of damage. Ensure that the unit and any devices or cords connected to it are properly grounded.

- ✓ Inspect the package and contents for signs of damage.
- ✓ Ensure all contents are included.
- ✓ Read the user manual thoroughly and become familiar with all safety symbols and instructions to ensure that the unit is operated and maintained safely.
- ✓ If the initial inspection reveals any damage or missing components, immediately notify Santec and if necessary, the carrier.

Operational Requirements

For the unit to meet the warranted specifications, the operating environment must meet the conditions outlined in Table 1.

Table 1: Environmental requirements

Parameter	Specification
Altitude	Up to 2000m
Temperature	5 to 40°C
Humidity	Up to 95% RH (5 to 40°C)
Voltage	Main supply voltage fluctuations must not exceed $\pm 10\%$ of the nominal voltage

Product Overview

OPM-200 Front Panel

A front view of the OPM-200 is shown in Figure 2. It features a touchscreen which displays information such as power, wavelength, modules, and settings

Standard configurations have the detector and analog output mounted on the front panel or have a remote-head M12 port.



Figure 2: Front view of an OPM-200 with two front panel 2mm InGaAs detectors

OPM-200 Rear Panel

A rear view of the OPM-200 is shown in Figure 3. See Table 2 for a detailed description.

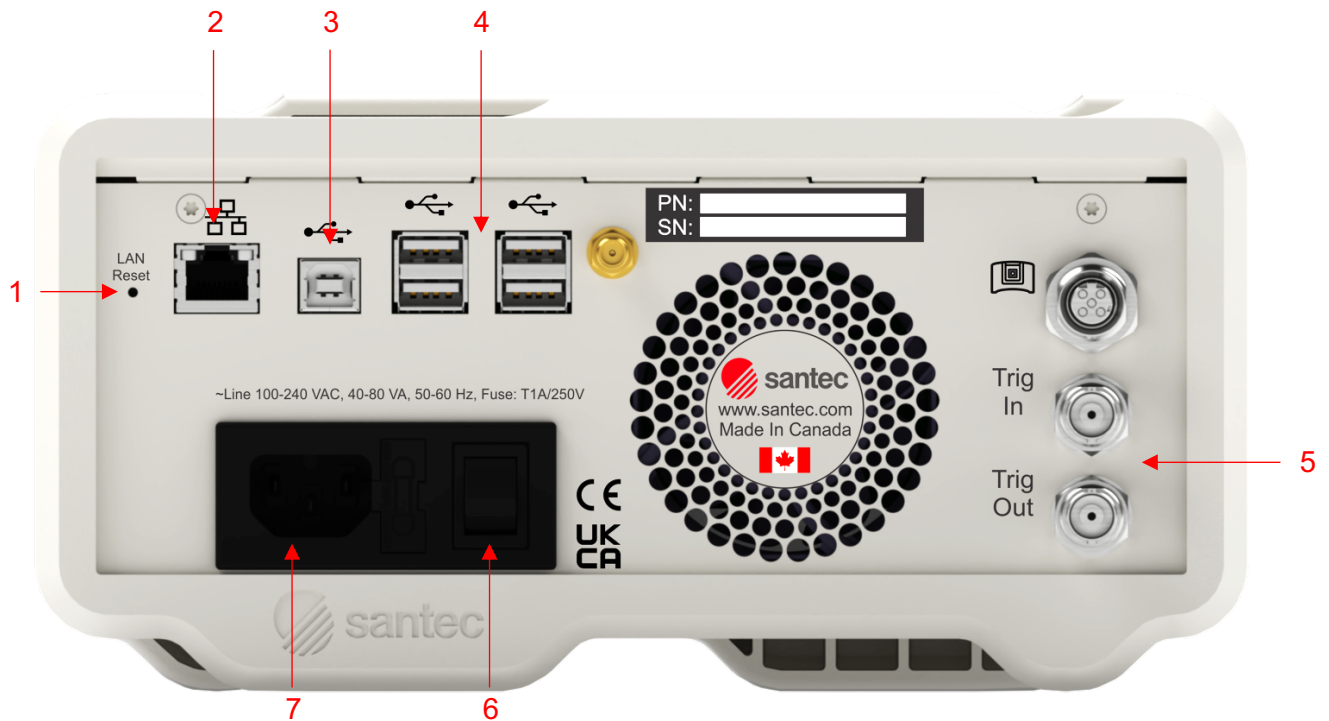


Figure 3: Rear view of an OPM-200

Table 2: Detailed description of the OPM-200 rear panel components (see Figure 3)

Item #	Description
1	LAN/Reset <ul style="list-style-type: none"> Press once: reset network settings
2	Ethernet port <ul style="list-style-type: none"> Connection to LAN
3	USB B port <ul style="list-style-type: none"> Connection to PC
4	USB A ports <ul style="list-style-type: none"> Connections to peripherals such as barcode scanner, etc. WARNING: do not connect USB powered devices such as cell phone chargers or inspection probes
5	Trigger In/Out <ul style="list-style-type: none"> BNC connection for trigger input and output
6	IO switch <ul style="list-style-type: none"> On/off toggle
7	Power input <ul style="list-style-type: none"> Contains user-replaceable fuse

RD-xxx-OPM-200 Remote-head Detector

The optional remote-head detectors are connected by an M12 cable. They can either be connected to the front panel remote-head port or connected to each other in series. Remote-heads are detected on startup.

Figure 4 and Figure 5 show the front and rear of an RD-IN2-OPM-200 (see Table 3 for a detailed description).



Figure 4: Front view of an RD-IN2-OPM-200 with FC sliding detector adapter (SD-FC)



Figure 5: Rear view of an RD-IN2-OPM-200

Table 3: Detailed description of the RD-IN2-OPM-200 rear panel components (see Figure 5)

Item #	Description
1	Analog Out <ul style="list-style-type: none"> BNC connection for analog output signal
2	M12 connectors <ul style="list-style-type: none"> Connection to the OPM-200 or another connected remote-head (order does not matter)

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OPERATION

Powering Up the Meter

To power up the meter:

1. Verify that the power switch is set to the “off” position (O). Connect the meter to an AC power supply using the power cord provided.
2. Toggle the power switch to the “on” position (I). The Santec logo will flash on the screen during the unit’s initialization.

All detectors are initialized and enumerated during boot up. To pair an additional remote-head detector, power off the OPM-200, connect the new detector then power on the OPM-200.

Touchscreen Operations

Top level

From the top level Module Select page, tap on an available power meter module for more details or swipe to access the top level Setup page which will affect settings for the selected (highlighted in green) power meter module (Figure 6).

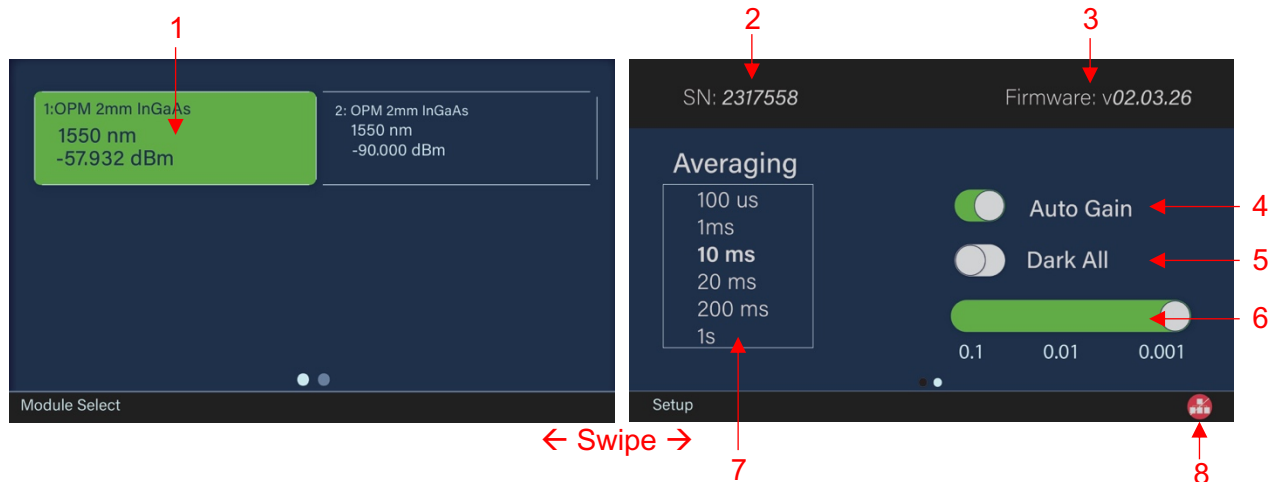


Figure 6: Top level touchscreen pages

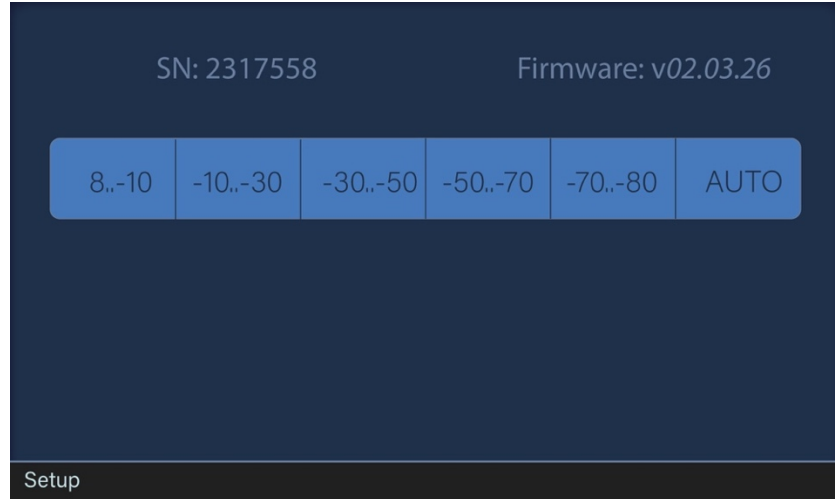


Figure 7: Gain selector flyout screen

Table 4: Detailed description of top level touchscreen page actions (Figure 6)

Item #	Description
1	Select module <ul style="list-style-type: none"> Tap on an available module to see details
2	Serial number of the OPM-200
3	Firmware version of the OPM-200
4	Gain range selection <ul style="list-style-type: none"> Auto-gain enabled (as shown) lets the OPM-200 change gain stage automatically. This setting is recommended when reading power one value at a time. Tap to get the gain selector flyout screen (Figure 7) <ul style="list-style-type: none"> Selecting a fixed gain range is suitable for applications where no interruption in power readings is required such as high-speed transient testing with data logging or alignment using the analog output. Note: most gain ranges typically extend approximately 10 to 20 dB lower than the lower limit. For more details, please contact support.inst@santec.com
5	User dark on all modules <ul style="list-style-type: none"> Cover all detectors with an SD-CAP then tap to perform a dark measurement on all detectors. If there is no dark stored, the button will show as disabled (as shown)
6	Resolution selection <ul style="list-style-type: none"> Tap to the desired resolution of the readings (as shown is 0.001 resolution)
7	Averaging time selection <ul style="list-style-type: none"> Select the desired averaging time (as shown is 10 ms averaging)
8	IP address <ul style="list-style-type: none"> When the OPM-200 is connected by Ethernet, the IP address is shown here. If there is no IP address assigned, a red logo is displayed (as shown)

Module level

If you select a module, the touchscreen pages will show you the details and let you modify the settings of that module (Figure 8).

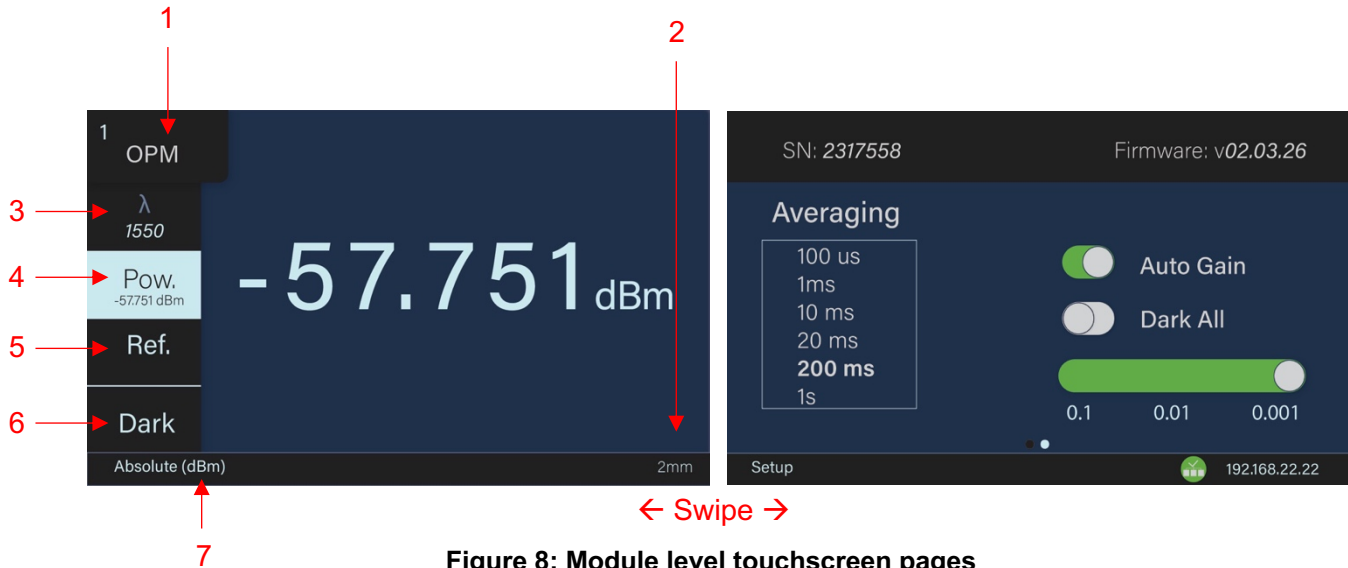


Figure 8: Module level touchscreen pages

The Setup page of the module level acts in the same way as the top level page except the settings are applied only to the selected module with the exception of Dark All which still applies to all detectors. See Table 5 for the module level main page descriptions.

Table 5: Detailed description of module level main page (Figure 8)

Item #	Description
1	Select module <ul style="list-style-type: none"> Tap to go to the top level module select page
2	Indicates the detector type (shown here 2mm InGaAs)
3	Wavelength selector <ul style="list-style-type: none"> Tap to set the wavelength (Figure 10)
4	Units selector <ul style="list-style-type: none"> Tap to open the units selector flyout (Figure 9)
5	Performance reference (zero) <ul style="list-style-type: none"> Tap to store the power level. The units will automatically change to dB if not already set.
6	User dark <ul style="list-style-type: none"> Cover the detector with an SD-CAP then tap to perform a dark measurement on the selected module. If there is no dark stored, the button will show as unselected (as shown)
7	Power mode <ul style="list-style-type: none"> Indicates the current power mode (Absolute dBm, Relative dB or Absolute W)

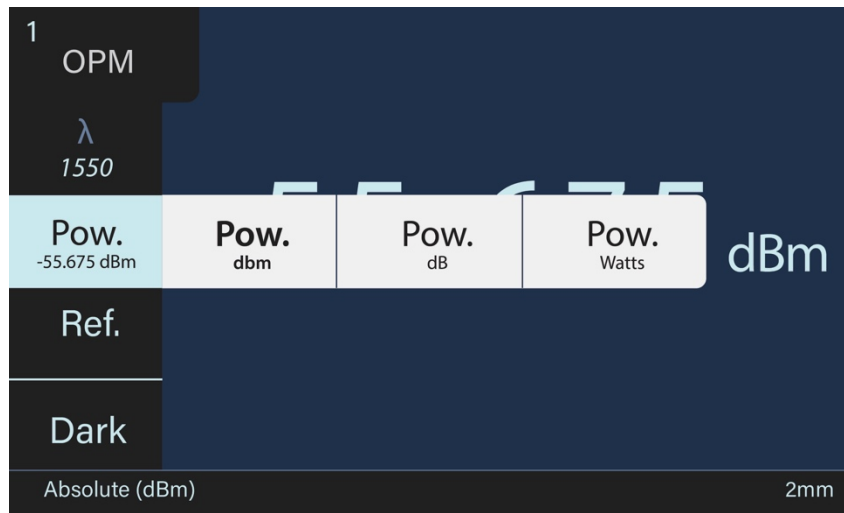


Figure 9: Units selector flyout

Tapping once on the wavelength button (λ) brings you to the wavelength selector page (Figure 10).

Tapping a second time on the wavelength button brings out the wavelength selector flyout (Figure 11) where up to 4 wavelengths can be stored in memory for convenience.

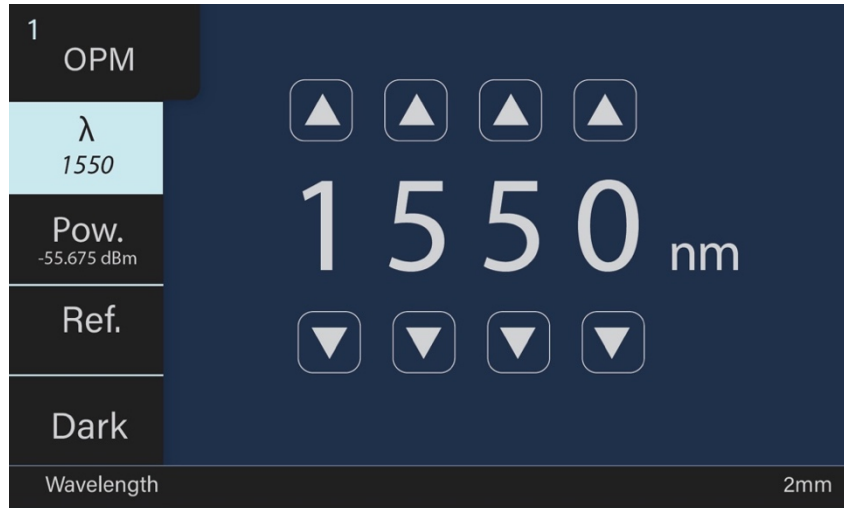


Figure 10: Wavelength selector page



Figure 11: Wavelength selector flyout

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OPM-200 WEBPAGE

To access the OPM-200 webpage, connect the meter to a network and on any computer or tablet on the same network, open a web browser (recommended: *Google Chrome*, *Microsoft Edge* or *Firefox*) and enter the OPM-200's IP address as indicated on the Setup page (Figure 12) into the URL bar.

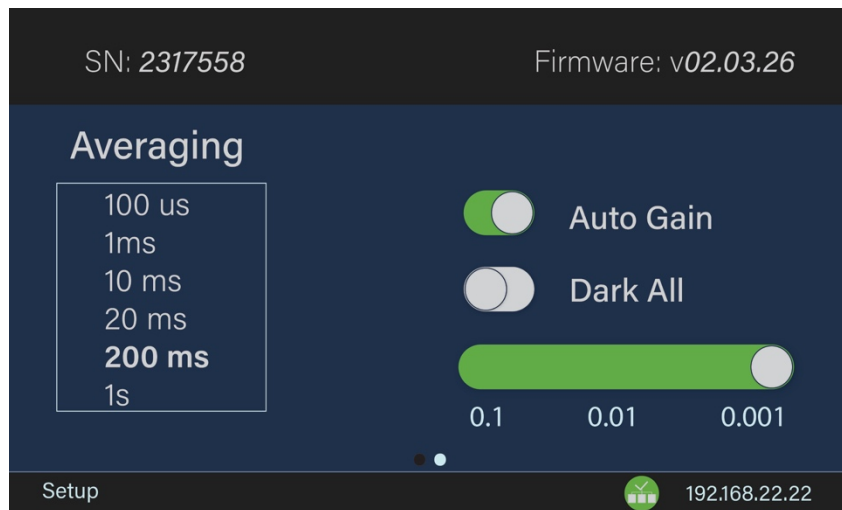


Figure 12: Setup page showing an OPM-200 connected by Ethernet with an IP address

Dashboard

The *Dashboard* tab shows the unit part number, serial number, and date of manufacturing. Additionally, the calibration or test report PDF is stored on the unit and can be downloaded to the PC.

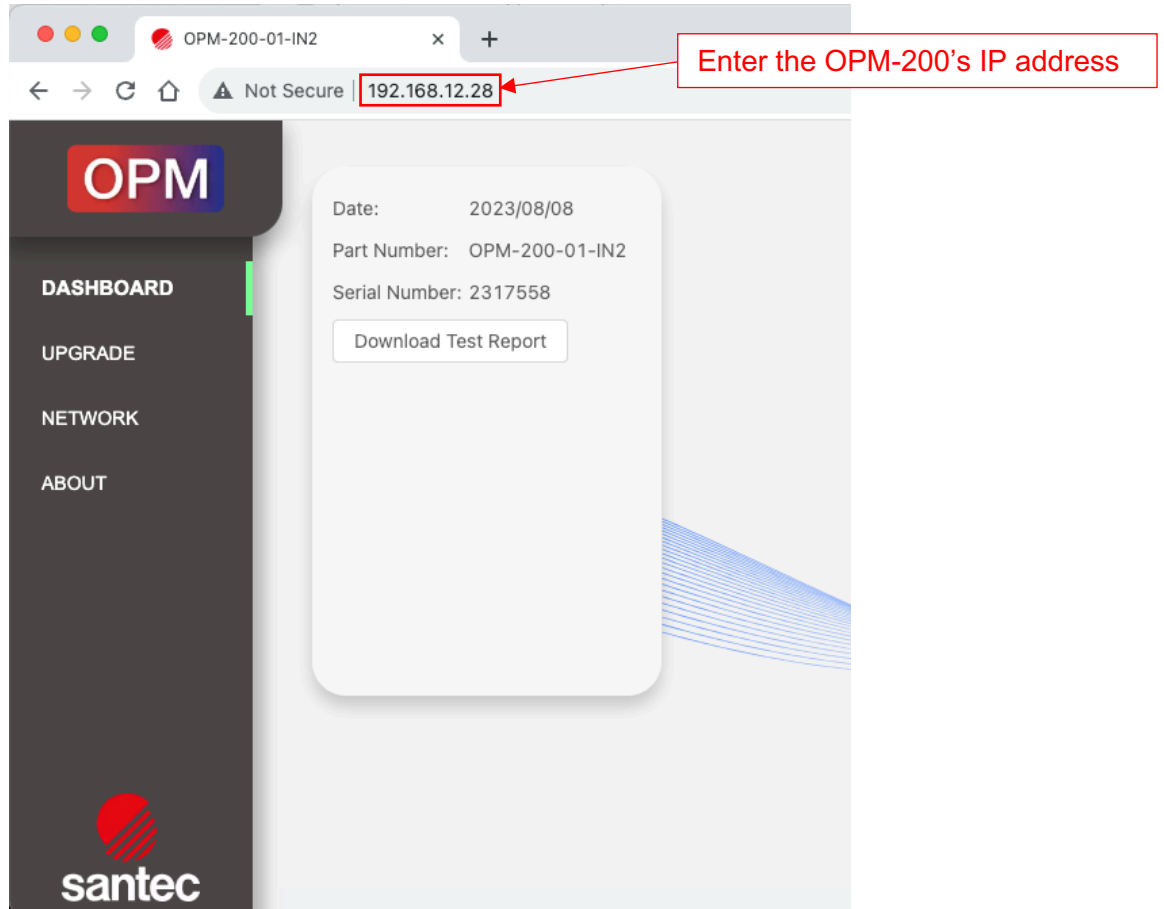


Figure 13: OPM-200 webpage – Dashboard

Upgrade

The Upgrade tab shows the current OPM-200 firmware as well as each connected power meter's firmware version (Figure 14). The power meter firmware is stored in the OPM-200 and can be updated without any additional files. The OPM-200 firmware requires a new `.up` file that is provided by Santec. Please contact support.inst@santec.com for more information.

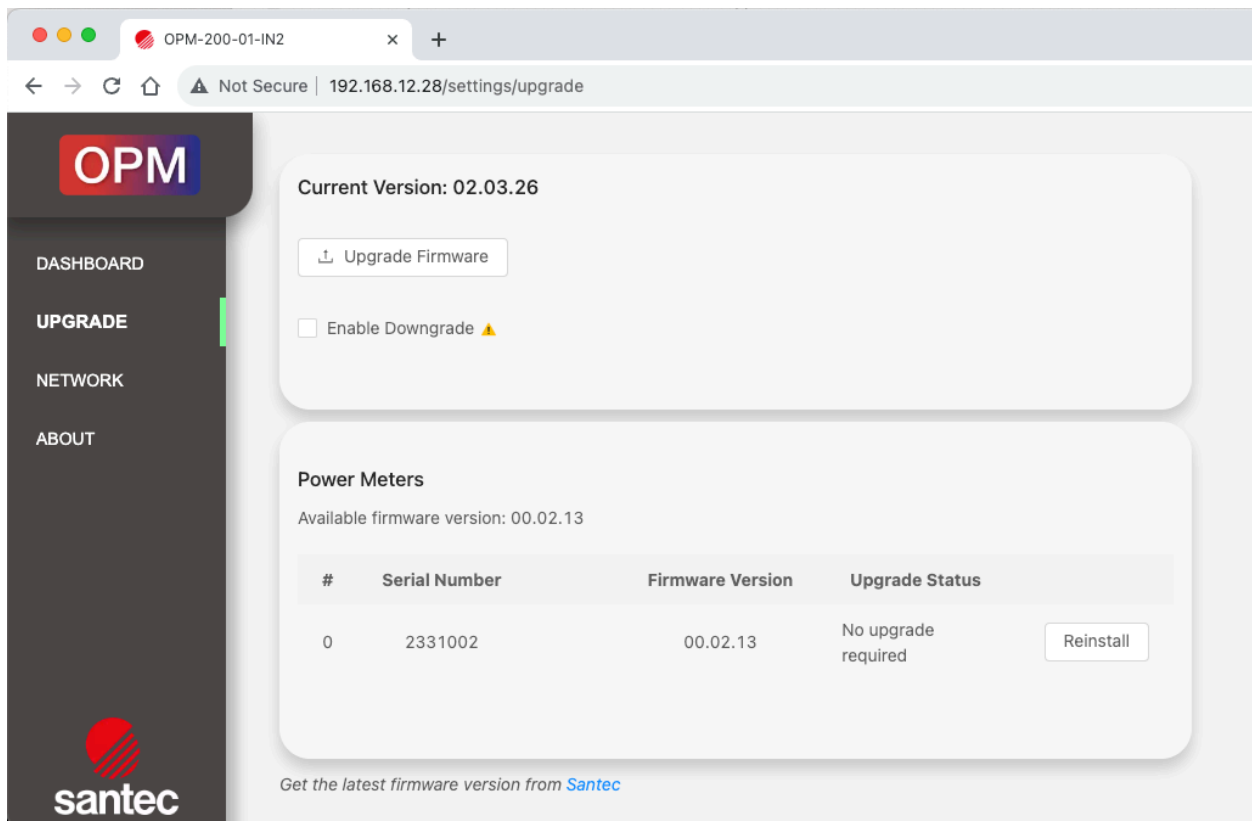


Figure 14: OPM-200 webpage – Upgrade

Network

You can view, edit, or reset the network settings of the OPM-200 from the Network tab (Figure 15)

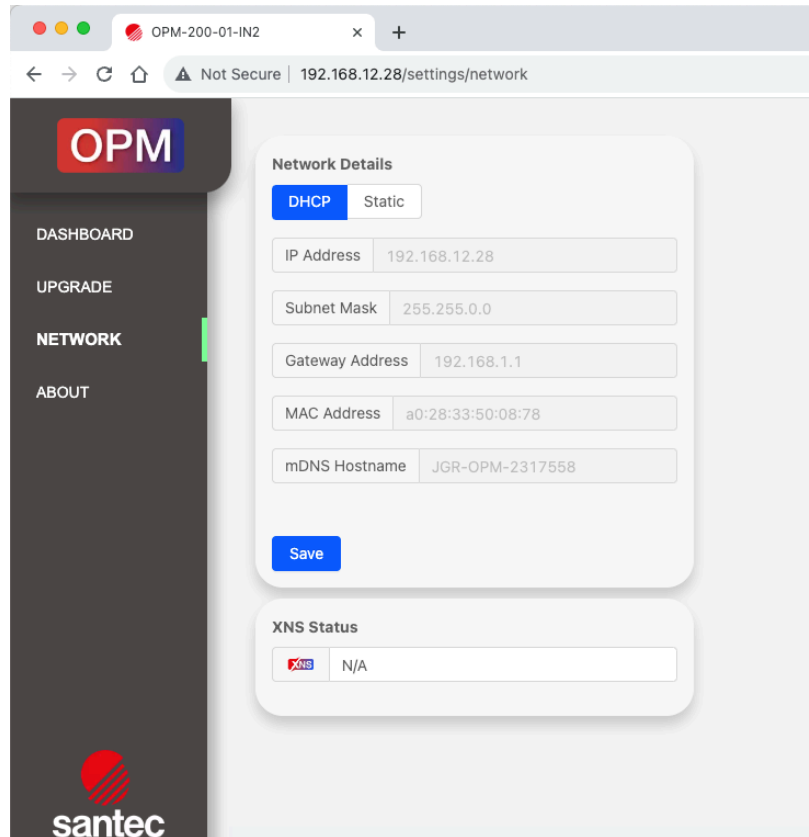


Figure 15: OPM-200 webpage – Network

About

The *About* tab (Figure 16) displays the unit's firmware version, model, and serial number. *Advanced* mode is reserved for Santec technicians and Santec-approved service centers. Any unauthorized use will void the unit's warranty.

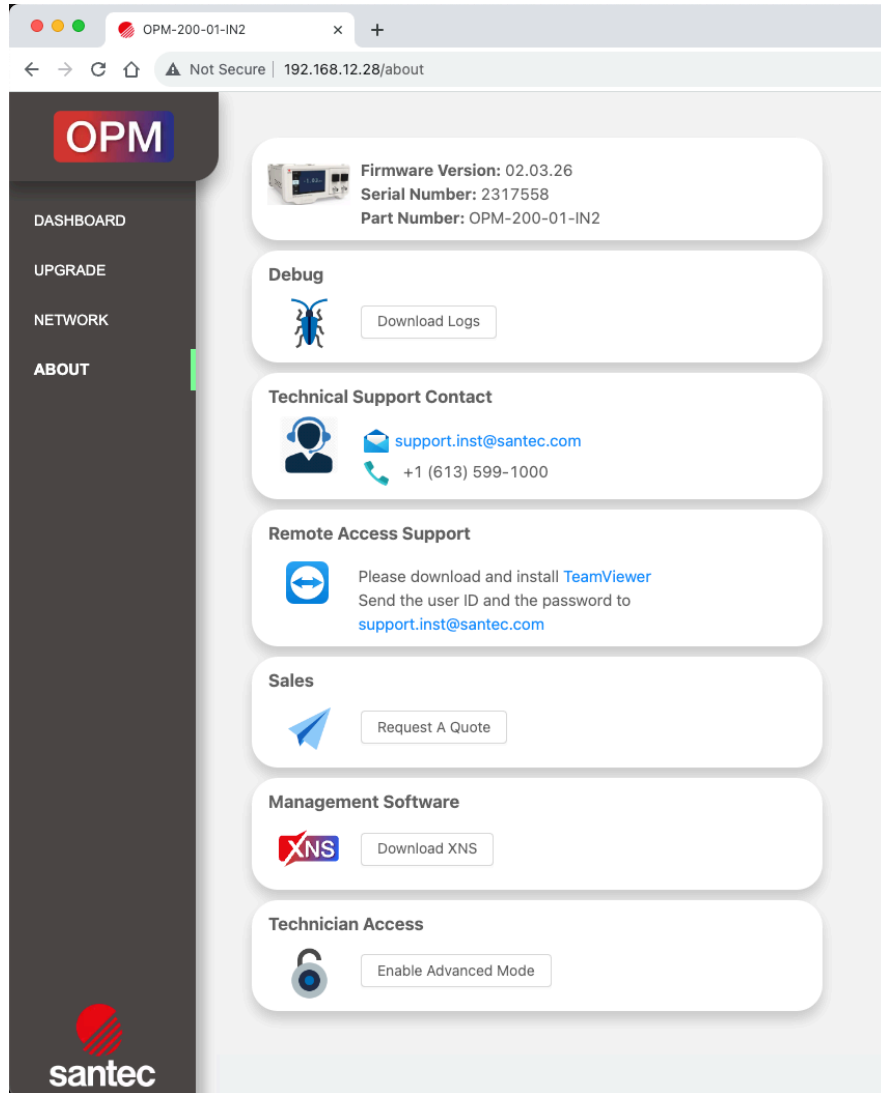


Figure 16: OPM-200 webpage – About

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PROGRAMMING GUIDE

Establishing Communication

The OPM-200 follows the *SCPI* (Standard Commands for Programmable Instruments) message-based programming standard. It conforms to the *USB TMC* (USB Test and Measurement) standard. Go to <https://inst.santec.com/resources/programming> for more resources.

USB

VISA drivers are required for USB communication.

- Recommended: *Rohde and Schwarz*
 - https://www.rohde-schwarz.com/gr/applications/r-s-visa-application-note_56280-148812.html
- Alternatives: *National Instruments, Keysight, etc.*

Ethernet

Each OPM-200 is factory pre-set to use DHCP. To connect the OPM-200:

- Connect the OPM-200 to the network via an Ethernet cable
- Swipe on the front panel touchscreen to the *Setup* page to view the OPM-200's IP address

The TCP/IP libraries provided by most operating systems are sufficient. Santec can provide a communications library upon request.

Note: any *VISA* implementation is capable of controlling the OPM-200 via TCP/IP.

Step-by-step Guide

This section will provide a step-by-step programming guide in a *.NET* programming environment such as *C#* or *VB.NET*. Steps 3-5 below can be skipped if using Santec's *CommunicationsLib.dll*, available here: <https://santec.imgix.net/Files/Programming/Santec.Hardware.zip>

1. Install *VISA* drivers on the development system
2. Connect the OPM-200 via its USB B port to the development system
3. Add a reference to *Ivi.Visa.dll* in your project:

`C:\Program Files (x86)\IVI Foundation\VISAMicrosoft.NET\Framework32\v2.0.50727\VISANET Shared Components 5.11.0\Ivi.Visa.dll`

4. Use the *IVI.Visa.GlobalResourceManager* to find all USB instruments on your system:

```
Public Overrides Function GetAllAddresses() As String()
    Try
        Dim nameList As New List(Of String)
        nameList = GlobalResourceManager.Find("USB?*INSTR")
        Return nameList.ToArray()
    Catch ex As Exception
        Return Nothing
    End Try
End Function
```

5. Open an *IMessageBasedSession* to the desired device using an address from the *nameList* in the previous step:

```
Private visa As IMessageBasedSession
```

```
visa = GlobalResourceManager.Open(addr)
```

6. Use the *Write* method to send SCPI commands and the *Read* method to retrieve results:

```
Public Overrides Function Read(ByVal readableOnly As Boolean) As String
    Dim response As String = String.Empty
    response = visa.RawIO.ReadString()
    If response = String.Empty Then
        Throw New Exception("Read from device failed")
    End If
    Return response
End Function
```

```
Public Overrides Sub Write(ByVal strCommand As String)
    visa.RawIO.Write(strCommand)
End Sub
```

Write commands require termination with the linefeed character `\n`.

Notes

1. Some commands can take several seconds to return. The *Read* timeout should be increased to at least 5000ms using *visa.TimeoutMilliseconds*
2. The OPM-200 runs SCPI commands synchronously. An **OPC?* command can be sent and a *1* will be returned when all operations have been completed:

```
Query("LAS:ENAB " + iWavelength.ToString() + ";OPC?" + vbCrLf)
```

Commands Lists

Table 6: Standard SCPI required commands list

*CLS
*ESE #
*ESE?
*ESR?
*IDN?

*OPC
*OPC?
*OPT?
*RCL "filename"
*RST
*SAV "filename"
*SRE #
*SRE?
*STB?
*TST?
*WAI
:STATus:OPERation:CONDition?
:STATus:OPERation:ENABle <byte>
:STATus:OPERation:ENABle?
:STATus:OPERation[:EVENT]?
:STATus:QUEStionable:CONDition?
:STATus:QUEStionable:ENABle <byte>
:STATus:QUEStionable:ENABle?
:STATus:QUEStionable[:EVENT]?
:STATus:PRESet
:SYSTem:ERRor[:NEXT]?
:SYSTem:VERSion?
:SYSTem:COMMunicate:LAN:ADDResS "ip/dhcp"

Table 7: OPM-200 commands list

:MODule:CATalog?	Returns a comma separated list of all modules present in the unit. List is always returned in order. I.e first item is module 1, last item is module n
:MODule#:INFO?	Return details about module "#". This info will be more detailed, equivalent to the data shown in the module selection grid.
:MODule:NUMber?	Return total number of modules present
:MODule:SElect	Select next module
:MODule:SElect #	Select module #
:MODule:SElect?	Return current selected instrument
:READ#:POWer?	Return current power from module n in dB or dBm. Alias: READ?
:READ:POWer:ALL?	Return list of current power from all modules in dB or dBm
:SENSe#:POWer?	Return current power from module n in dB or dBm
:SENSe:POWer:ALL?	Return list of current power from all modules in dB or dBm

:SENSe#:DARK	Do the dark reading for module n and store as user dark. Set STAT:OPER:COND bit when darking is ongoing. Alias: ZERO
:SENSe:DARK:ALL	Do dark reading for all modules and set the toggle on GUI Setup screen and store as user darks. Set STAT:OPER:COND bit when darking is ongoing.
:SENSe:SENSitivity:ALL #	<fast> or <standard>
:SENSe#:SENSitivity #	<fast> or <standard>
:SENSe#:SENSitivity?	Return sensitivity of current module
:SENSe#:ATIME #	Set averaging time with optional unit: <avg.time> US MS S If no unit supplied, Seconds is assumed. Min. value =10US. Alias: AVG #
:SENSe#:ATIME?	Return current averaging time in ms. Alias: AVG?
:SENSe:ATIME:ALL #	Set averaging time with optional unit: <avg.time> US MS S If no unit supplied, Seconds is assumed. Min. value =10US
:SENSe#:RANGE:AUTO #	Enable automatic gain ranging 0: OFF or 1: ON Alias: AUTO
:SENSe#:RANGE:AUTO?	Return current auto gain setting 0: OFF or 1: ON. Alias: AUTO?
:SENSe#:POWer:RANGE #	Set the fixed power range at 10dBm intervals. The number is rounded to the closest multiple of 10. Alias: LEV #
:SENS#:POWer:RANGE?	Return current power range. I.e 0dBm -10dBm etc.
:SENSe#:REFeRence	Take current dBm power reading as reference. Set reference state to 1 (i.e relative dB)
:SENSe#:REFeRence #	Set supplied value as the reference value in dBm. Set reference state to 1 (i.e relative dB)
:SENSe#:REFeRence?	Return current reference value of module # in dBm.
:SENSe#:MODE "input"	Set the power mode of module # to "dbm", "db" or "watt".
:SENSe:MODE:ALL "input"	Set the power mode of all modules to "dbm", "db" or "watt".
:SENSe#:MODE?	Return the power mode of module #.
:SENSe:WAVelength:ALL #	Set wavelength for all modules to #
:SENSe#:WAVelength #	Set wavelength of module n to #
:SENSe#:WAVelength?	Return wavelength of module n
:SENSe:RESolution:ALL #	Set resolution <1 2 3> where 1: 0.1 2: 0.01 3: 0.001

:SENSe#:RESolution #	Set resolution <1 2 3> where 1: 0.1 2: 0.01 3: 0.001
:SENSe#:RESolution?	Return current resolution
:SENSe#:TRIGger:INput:EDGE?	Return current trigger type. 0:Rising 1:Falling
:SENSe#:TRIGger:INput:EDGE #	0: trigger on the high edge of the BNC TTL input (rising edge), 1: trigger on the low edge of the BNC TTL input (falling edge) ALIAS: TRIG #
:SENSe#:TRIGger:INput #	Define how the module reacts to triggers. Also ARMS the module. <IGNore>: ignore incoming triggers, <SMEasure>: perform 1 measurement per trigger and store in data buffer, <FREErun>: on first trigger start capturing data as defined by SENSE#:FUNCTION:PARAMeter:LOGGing
:SENSe:TRIGger:INput:ALL #	Define how all modules react to triggers. Also ARMS all modules.
:SENSe#:FUNCTION:PARAMeter:LOGGing #,#	<data points>,<avg time>US MS S . Set # of data points to log and the averaging time. Max data points is 130,000. ALIAS: LOGN #,#
:SENSe#:FUNCTION:PARAMeter:LOGGing ?	Return number of data points (integer) and averaging time as a float value in seconds. ALIAS: LOGN?
:SENSe#:FUNCTION:RESult:BLOCK? [offset]	Return the data array of the last logging acquisition. If binary: One measurement value is a 4 byte (2byte?) little-endian IEEE 754 single precision value. Offset is optional. No parameter means return next block. ALIAS: LOGG?
:SENSe#:FUNCTION:RESult:MAXBlocksize?	Returns the maximum block size for a single SCPI transfer for power meter data acquisition functions. This return would be dependent on the method used to send the command (ETH or USBTMC)
:SENSe#:FUNCTION:STATe #,#	<LOGGing> and <START>/<STOP> Start/stop the logging function, no need to wait for hardware trigger. For now the first parameter only has one option <LOGGing>
:SENSe#:FUNCTION:STATe?	Return type of function running and status. "LOGGing,<status>". <0>=logging complete, <1> = logging in progress, <2>=logging waiting for trigger

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MAINTENANCE

Cleaning the Unit

1. Unplug the unit from the line power.
2. Clean the enclosure with a damp cloth.
3. Do not plug the unit back in until it is completely dry.

Cleaning the Detector Glass

Remove the detector adapter and inspect the detector glass for any contamination or damage. Holding up a light and observing at an angle can help identify defects. Any small defects can affect the accuracy of the readings. The following steps can be taken if there is possible contamination from dust or debris.

1. Use compressed air to gently blow away any possible contamination.
2. Use optical grade isopropyl alcohol (IPA) or optical grade 200° ethanol (**do not use rubbing alcohol** which can contain up to 30% water) and lint-free swabs or lint-free wipes to carefully wipe the surface.
3. With the other end of the swab or a dry spot on the wipe, dry the areas cleaned.
4. Blow the areas cleaned with compressed air.

If there is still a defect, the glass is likely damaged. Please contact support.inst@santec.com for additional instructions.

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STORAGE AND SHIPPING

Damage can occur from improper handling. Make sure to maintain the unit within the specified temperature range during storage or shipping. Please follow the recommendations below to minimize the possibility of damage:

- If possible, pack the unit in its original packing material when shipping.
- Avoid high humidity or large temperature fluctuations that could generate condensation within the unit.
- Avoid unnecessary shocks and vibrations.

Returning Instruments to Santec

As indicated above, please ship the returned material in the original shipping box and packing material. If these are not available, follow the guidelines below:

1. Contact Santec to obtain an RMA number.
2. Cover the front panel with foam to prevent damage.
3. Wrap the unit in anti-static packaging. Use anti-static connector covers.
4. Pack the unit in a strong enough shipping box considering the unit's weight.
5. Use enough shock-absorbing material (10 to 15 cm) to cushion the unit and prevent it from moving inside the box. Pink poly anti-static foam is recommended.
6. Seal the shipping box securely.
7. Clearly mark FRAGILE on at least 3 of the 4 sides of the box.
8. Always provide the model and serial number of the unit and, if applicable, the RMA number on any accompanying documentation. If possible, indicate the RMA number on the box itself to facilitate identification.

Contact Information

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SPECIFICATIONS

Table 8: OPM-200 optical and electrical specifications sheet

Parameter	Specification	
Detector Type	2mm InGaAs	Integrating sphere (InGaAs)
Wavelength Range (nm)	840 to 1700	
Power Range (dBm)	8 to -80	30 to -50
Uncertainty at Ref Conditions ^{1,2,3}	± 3.7% (840 to 1200 nm) ± 2.7% (1200 to 1650 nm) ⁴	
Power Resolution (dB)	0.001	
Wavelength Resolution (nm)	1	
Linearity (dB) ^{1,2}	± 0.03 + 20 pW (840 to 1200 nm) ± 0.02 + 5 pW (1200 to 1650 nm) ⁵	± 0.04 + 2 nW (840 to 1200 nm) ⁶ ± 0.04 + 500 pW (1200 to 1650 nm) ^{6,7}
Polarization Dependent Responsivity (dB) ²	0.015	
Averaging Time	50 μs to 1 second	
Analog Output	0 to 2.2 V ⁸	
Data Logging	128,000 points per detector	
Remote Interface	USB or Ethernet	
Display	5" touch screen	
Input Voltage	100 - 240 V AC, 50 - 60 Hz	
Power Consumption (VA)	60 maximum	

¹ Averaging time ≥ 10 ms.

² At ambient temperature 23 ± 3 °C, within 1 year of calibration.

³ At -10 dBm, CW source, FWHM of source < 10 nm, center wavelength of source within 0.5 nm of OPM-200 setting.

⁴ ± 3.7% above 1650 nm.

⁵ For power ≤ 7 dBm. ± 0.03 + 20 pW above 1650 nm.

⁶ For power ≤ 10 dBm. ± 0.07 dB from 10 to 20 dBm and ± 0.15 dB from 20 to 30 dBm.

⁷ ± 0.04 + 2 nW above 1650 nm.

⁸ Up to 10 kHz bandwidth.

Table 9: OPM-200 mechanical and environmental specifications sheet

Parameter	Specification
Unit Dimension W x H x D (cm)	
OPM-200	23.5 x 12 x 32.5
RD-IN2-OPM-200	8.5 x 5 x 13.3
RD-INS-OPM-200	6.8 x 8.5 x 13.3
Remote-head Mounting Hole Thread Size	M6
Shipping Box Dimensions W x H x D (cm)	36.5 x 39 x 53
Unit Weight (kg)	
OPM-200	3
RD-IN2-OPM-200	0.4
RD-INS-OPM-200	0.6
Total Shipment Weight (kg) ¹	4
Operating Temperature (°C)	5 to 40
Storage Temperature (°C)	-40 to 70
Humidity (Non-condensing)	Maximum 95% RH from 5 to 40°C

¹ OPM-200 only. Add weight for each remote-head.



In the event of any trouble with this product, turn the unit off in accordance with the procedures to shut off the power described in this operation manual, disconnect the power source cord, make sure the product name and serial number described on the name plate of the product, and then contact our dealer at your place or directly contact us at Santec Photonics Laboratories. Our telephone number and facsimile number are shown below. However, we are not responsible for any trouble arising from your own repair or modification on this product.

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