User Guide

High-Performance Power Meter

www.EXFO.com

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Trademarks

EXFO's trademarks have been identified as such. However, the presence or absence of such identification does not affect the legal status of any trademark.

Units of Measurement

Units of measurement in this publication conform to SI standards and practices.

Patents

The exhaustive list of patents is available at EXFO.com/patent.

Version number: 3.0.0.1

Contents

Regulatory Information

Electromagnetic Interference and Compatibility Regulatory Information

For Electromagnetic Interference and Compatibility Regulatory information on your product, refer to the user documentation of your platform.

IMPORTANT

Use of shielded remote I/O cables, with properly grounded shields and metal connectors, is recommended in order to reduce radio frequency interference that may emanate from these cables.

European Community Declaration of Conformity

The full text of the EU declaration of conformity is available at the following Internet address: *www.exfo.com/en/resources/legal-documentation*.

1 Introducing the High-Performance Power Meter

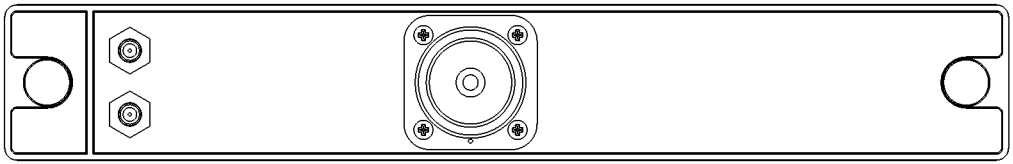
Designed for several platforms to meet your needs, the High-Performance Power Meter is a module available in different models. It is used with the OHS-1700 Optical Head.

Main Features

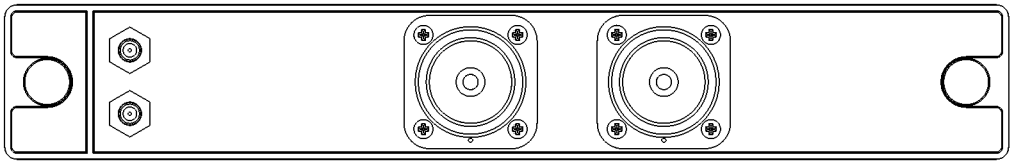
The High-Performance Power Meter is offered with the following one-, two-, or four-channel models. The type of connectors will differ depending if you are using standard FOAs or the optical head.

Models With Standard FOAs

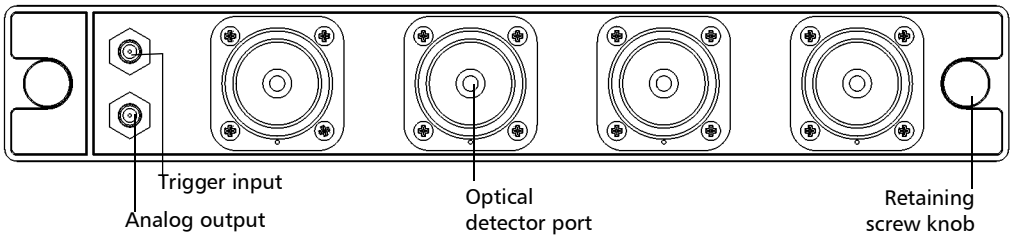
One Channel



Two Channels

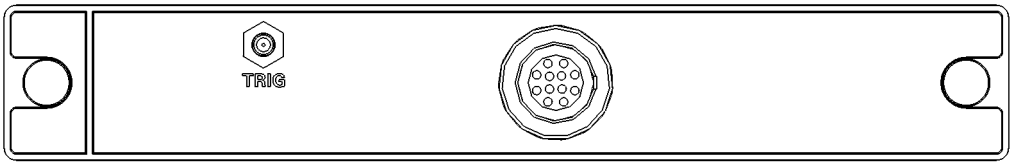


Four Channels

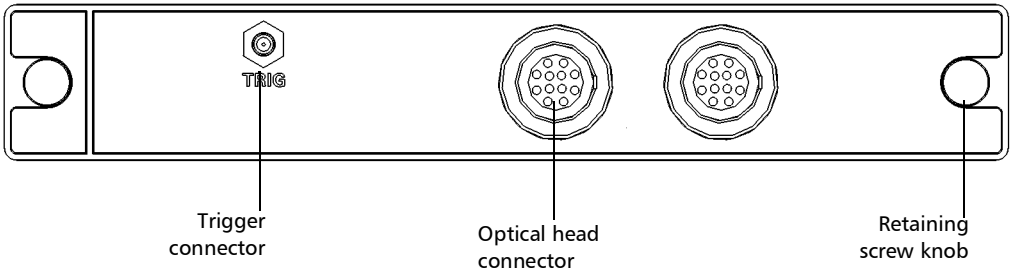


Models With Optical Head Connectors

One Channel



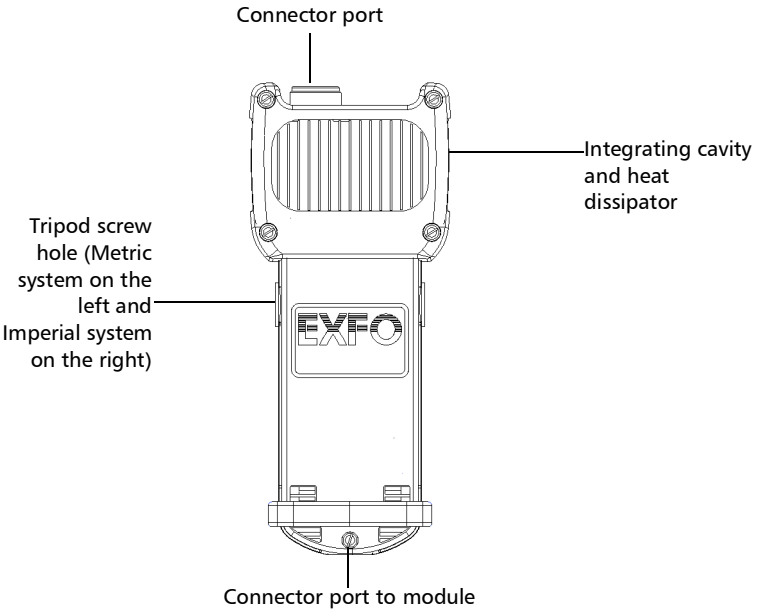
Two Channels



The OHS-1700 Optical Head is offered in Ultra-High Power option (up to 37 dBm).

It features a high sampling rate and fast stabilization, and comes in one- or two-channel options (each detector is independent).

The OHS-1700 Optical Head allows you to handle power signals in a safe and efficient way. You can connect up to two optical heads to a module, depending on the model you have acquired. The optical head functions with connectorized and non-connectorized fiber.



The High-Performance Power Meter supports local control, or remote control using SCPI or REST commands.

You can also use the IVI drivers you can find on the EXFO Website at www.exfo.com. The drivers have their own specific documentation to help you use them with your application.

Typical Applications

Your power meter is suitable for numerous applications, including the following:

- Transceiver testing
- Amplifier characterization
- PDL measurements
- Network monitoring
- Passive component characterization

Technical Specifications

To obtain this product's technical specifications, visit the EXFO Web site at *www.exfo.com*.

Conventions

Before using the product described in this guide, you should understand the following conventions:

WARNING

Indicates a potentially hazardous situation which, if not avoided, could result in *death or serious injury*. Do not proceed unless you understand and meet the required conditions.

CAUTION

Indicates a potentially hazardous situation which, if not avoided, may result in *minor or moderate injury*. Do not proceed unless you understand and meet the required conditions.

CAUTION

Indicates a potentially hazardous situation which, if not avoided, may result in *component damage*. Do not proceed unless you understand and meet the required conditions.

IMPORTANT

Refers to information about this product you should not overlook.

2 Safety Information

Your power meter does not contain laser components in itself. However, you will be using it with light sources.

WARNING

Do not install or terminate fibers while a light source is active. Never look directly into a live fiber and ensure that your eyes are protected at all times.

WARNING

The use of controls, adjustments and procedures, namely for operation and maintenance, other than those specified herein may result in hazardous radiation exposure or impair the protection provided by this unit.

WARNING

If the equipment is used in a manner not specified by the manufacturer, the protection provided by the equipment may be impaired.

WARNING

Use only accessories designed for your unit and approved by EXFO. For a complete list of accessories available for your unit, refer to its technical specifications or contact EXFO.

IMPORTANT

Refer to the documentation provided by the manufacturers of any accessories used with your EXFO product. It may contain environmental and/or operating conditions limiting their use.

IMPORTANT

When you see the following symbol on your unit  **, make sure that you refer to the instructions provided in your user documentation. Ensure that you understand and meet the required conditions before using your product.**

IMPORTANT

When you see the following symbol on your unit  **, it indicates that the unit is equipped with a laser source, or that it can be used with instruments equipped with a laser source. These instruments include, but are not limited to, modules and external optical units.**

IMPORTANT

Other safety instructions relevant for your product are located throughout this documentation, depending on the action to perform. Make sure to read them carefully when they apply to your situation.

WARNING

Use only accessories designed for your unit and approved by EXFO. For a complete list of accessories available for your unit, refer to its technical specifications.

The power consumption of all High-Performance Power Meter units is below 2.5 W for models with standard FOAs and 8 W for models with the optical head.

Note: *Refer to the platform's user guide for additional test equipment safety information and ratings.*

3 Setting Up Your High-Performance Power Meter

Once you have accessed your module, either directly on the platform or from your Web browser, you can set the following parameters on your High-Performance Power Meter:

- Channel display
- Wavelength selection and management
- Measurement unit selection
- Display resolution
- Refresh rate
- Measurement range
- Managing configurations

Note: *Refer to your platform's user guide for more information about starting applications directly from it.*

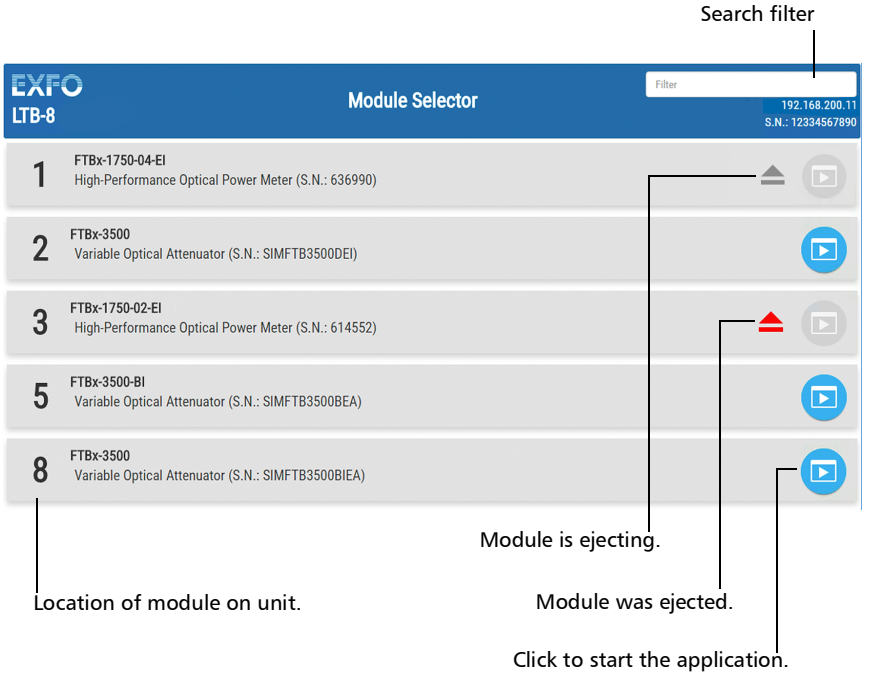
Note: *Reverting to factory settings will not change the name given to the channels. It will not change the user reference or correction factor lists either.*

Selecting a Module from a Web Browser

Note: *This feature is not necessarily available on all platforms.*

If you are accessing your module from a Web browser, you can select which module or application you want to work with. Simply enter http://[IP address of your unit] in your browser address box.

To only view the High-Performance Power Meter modules, enter http://[IP address of your unit]/XXXX.



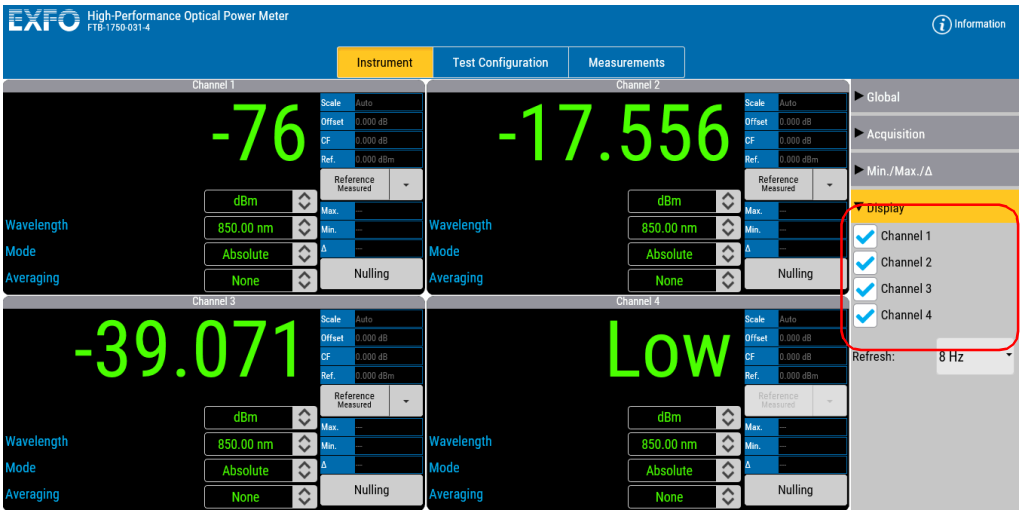
Note: *The list you see on-screen will differ depending on which modules are in your unit.*

Setting Channel Display

The channel display allows you to select which channels you want to view when using a multichannel power meter. You can display up to four optical channels using a four-channel power meter.

To set the channel display:

1. From the **Instrument** function tab, click the **Display** tab to view the available channels.
2. Select the desired channel or channels.



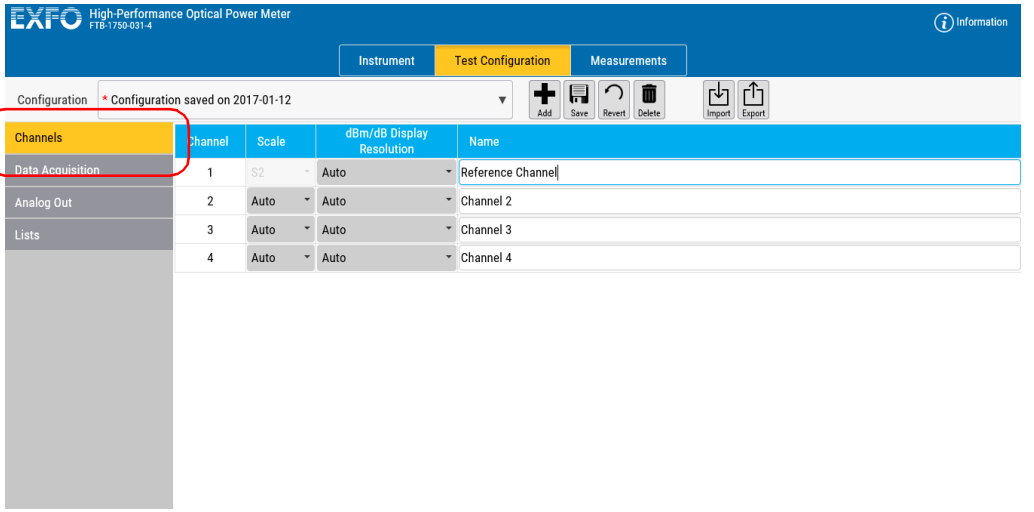
The data display immediately reflects your selection.

Naming Channels

A user-selected name can be given to each power meter channel. The channel name appears in the main window. Naming individual channels is particularly useful when you need to display more than one power channel at the same time. The name should be as self-explanatory as possible (for example, Power-Fiber 3).

To enter a channel name:

1. Click the **Test Configuration** function tab.



2. Select the **Channels** tab.
3. Type in a self-explanatory name in the **Name** box corresponding to the channel you want to modify. The name is changed automatically in the **Instrument** tab.

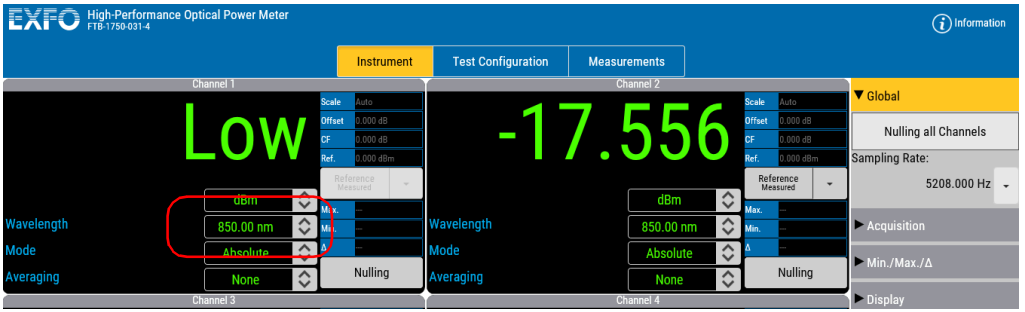
Selecting the Wavelength

When taking accurate measurements, your power meter must be set to the correct wavelength to compensate for the photodetector responsivity at the incident wavelength. Ideally, the power meter's wavelength should be set as close as possible to that of the optical source being used.

The wavelength can be selected from the wavelength list or you can enter a value manually. To set the wavelength list, see *Managing Wavelength Lists* on page 16.

To select the wavelength:

1. Select the channel for which you want to set the wavelength (if you have a multiple-channel power meter).
2. Select the wavelength using the appropriate button.



3. If you select **Enter a Value**, you will be prompted to enter the value you want to use. Click **OK** once you are done.

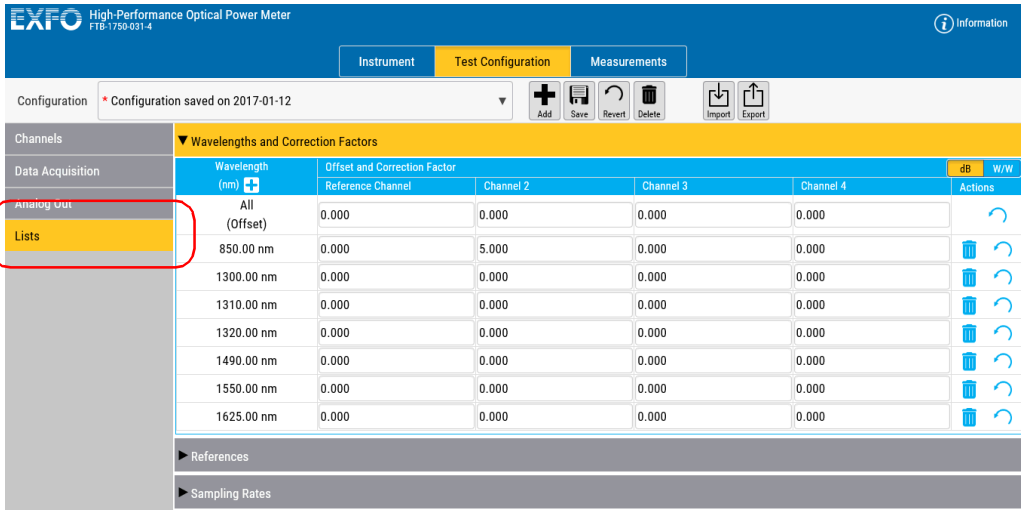
Note: *The maximum value is 1700 nm.*

Managing Wavelength Lists

The wavelengths you want to use with your High-Performance Power Meter and OHS-1700 can be entered in the **Wavelength** list. These wavelengths can be used with offsets and correction factors, whereas wavelengths entered manually in the **Instrument** function tab are not affected. Please refer to the Certificate of Compliance supplied with your power meter for information on the wavelength range.

To add a wavelength to the list:

1. From the **Test Configuration** function tab, select the **Lists** tab.



2. Select the **Wavelengths and Correction Factors** tab.
3. Click .
4. Enter the wavelength value to be added.
5. Click **OK**.

Note: *A warning message is displayed if the new wavelength is not within the power meter's wavelength range. The maximum value is 1700 nm.*

To delete a wavelength from the list:

1. From the **Test Configuration** function tab, click the **List** tab.
2. From, the **Wavelengths and Correction Factors** list, select the wavelength to be deleted.
3. Click , then confirm the operation.

Selecting the Measurement Unit

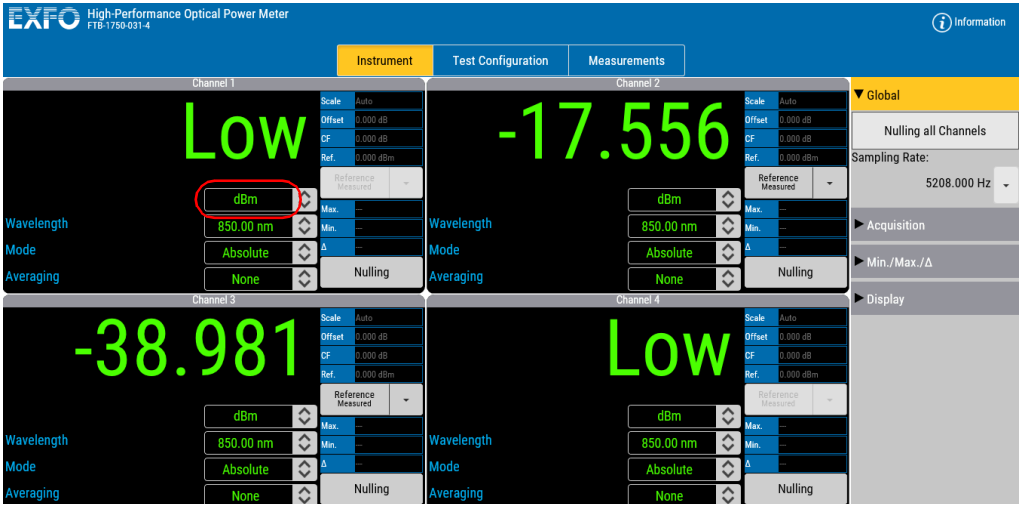
Power measurements can be displayed in dB, dBm, W, or W/W (the latter indicating the ratio between the power received and the reference for the current wavelength and channel). When W or W/W is selected, the software automatically selects W units (pW, nW, μW, mW), depending on the measured power and sensitivity of the detector.

When a relative unit is selected (dB or W/W), the most recent reference value used will become the current reference value.

To select the measurement unit:

1. In the channel window for which you want to set the measurement unit (if you have a multiple-channel power meter).

2. Use the arrow buttons next to the unit list to change the value.



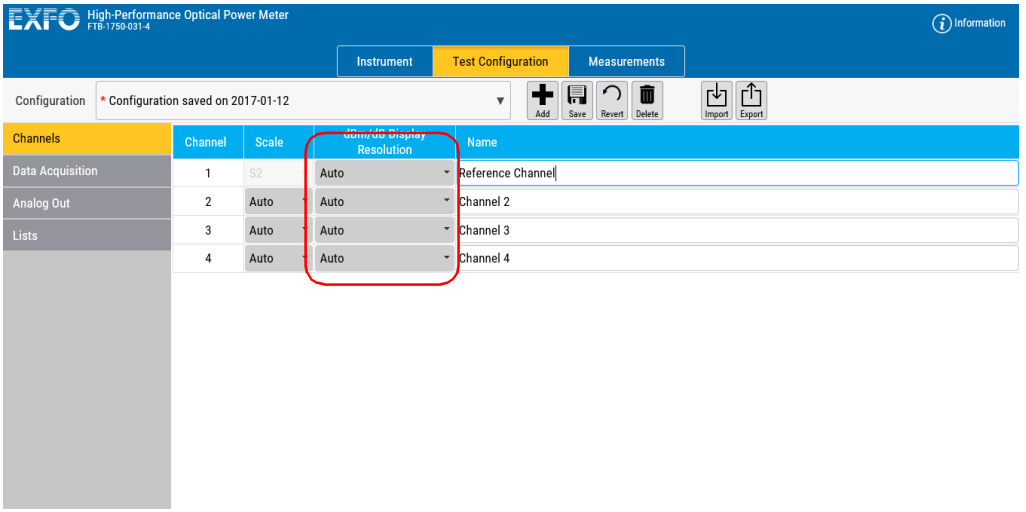
Setting the Display Resolution

Depending on the required resolution and operating power level, 0, 1, 2, or 3 digits can be displayed after the decimal point. When the auto setting is selected, the display resolution is determined by the power level being measured.

Note: *The Auto marker in the data display does not refer to the automatic display resolution but to the measurement range (see* Setting the Measurement Range *on page 21).*

To select the display resolution of a power measurement expressed in dB or dBm:

1. Click the **Test Configuration** function tab, then click the **Channels** tab.
2. Use the drop-down list in the row corresponding to the channel you want to modify.

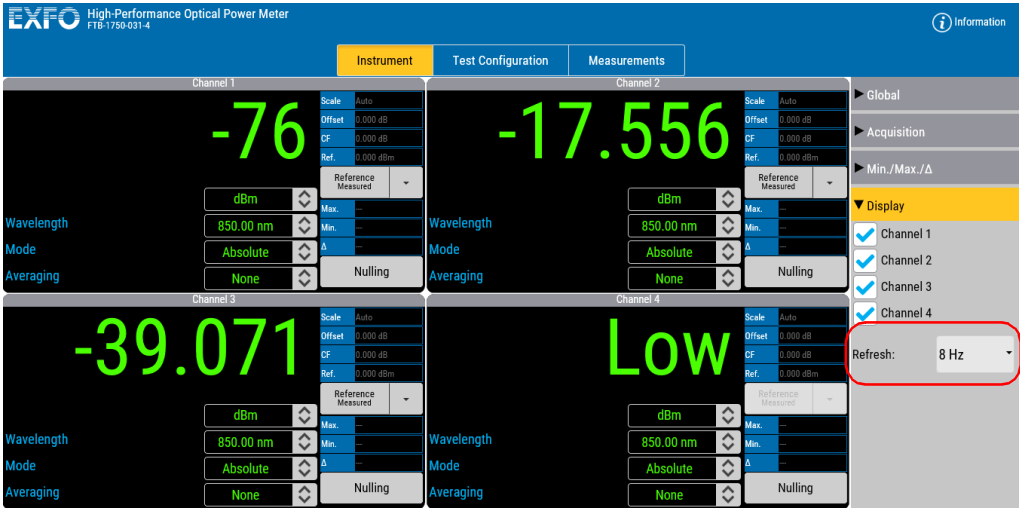


Setting the Refresh Rate

This function allows you to define the refresh rate of the power readings on the display. The refresh rate is the number of times per second that a new power measurement will be displayed on the screen. The refresh rate applies to all channels when using a multichannel power meter.

To set the refresh rate:

1. From the **Instrument** tab, select the **Display** tab.
2. Select the refresh rate you want to use in the list of available choices.



Note: *The refresh rate can be faster or slower than the sampling rate; however, only a refresh rate slower than the sampling rate will have an effect.*

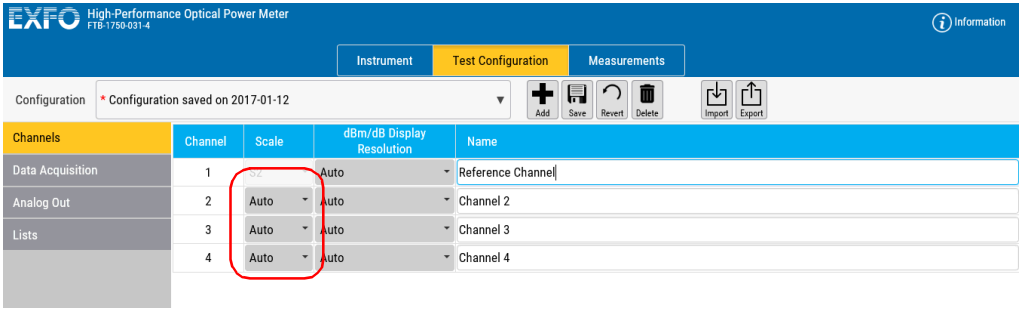
Setting the Measurement Range

The measurement range and gain scale applied to the power detector can be manually selected to prevent the automatic scale adjustment performed by the instrument. A manual adjustment of the dynamic gain scale will lock the measurement range to a specific level.

Each channel is adjusted independently in the case of a multichannel power meter.

To set the measurement range:

1. Click the **Test Configuration** function tab, then select the **Channels** tab.
2. If necessary, select the channel for which you want to set the range.
3. Use the arrow buttons next to the **Scale** list to select the range you want to use.



Note: *Select **Manual** range for an acquisition when the input signal has unstable or modulated variations.*

Managing Configurations

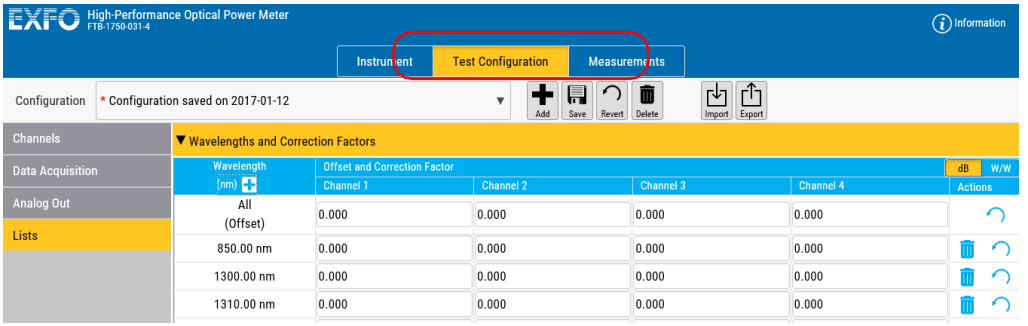
You can create configurations that will keep your test settings. The actions made on the configuration (saving, deleting, etc.) affect all tabs of the unit at the same time.

The configuration will include the following items:

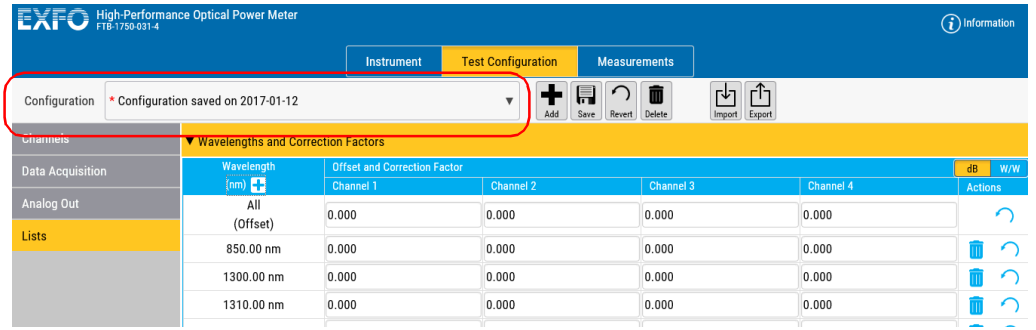
- Absolute/relative modes
- Measurement units
- Wavelengths
- References
- Offsets
- Correction factors
- Sampling rates
- Selected channels for display
- Refresh rate
- Scale selections
- Resolution settings
- Channel names
- Acquisition configuration
- Analog output settings

To save changes in an existing configuration:

1. Select the **Test Configuration** tab.



2. Select a configuration in the list.

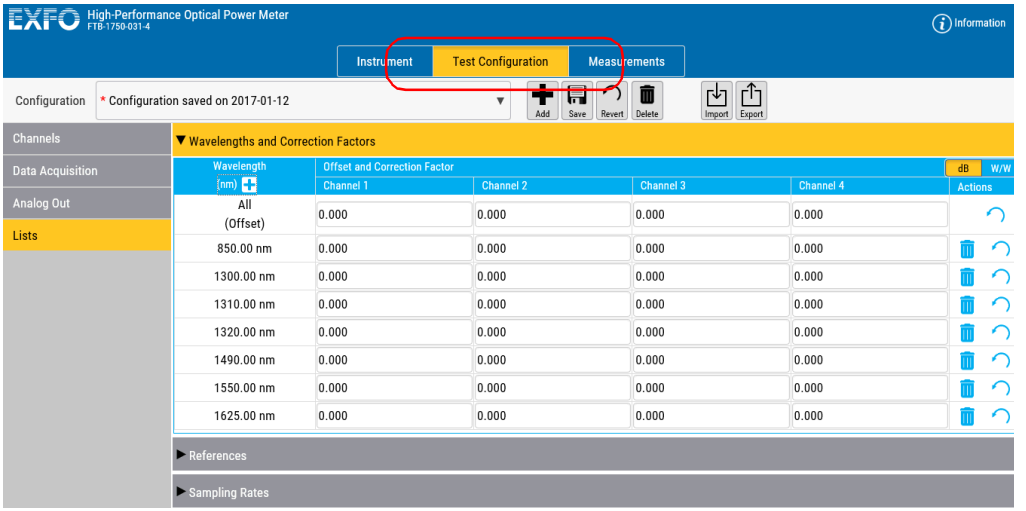


3. Change the configuration as needed.
4. Click 

.

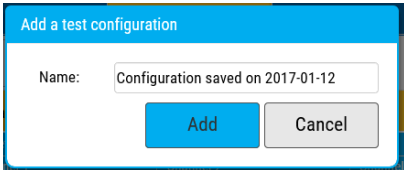
To create a configuration:

1. Select the **Test Configuration** tab.



2. Change the configuration as needed.
3. Click 

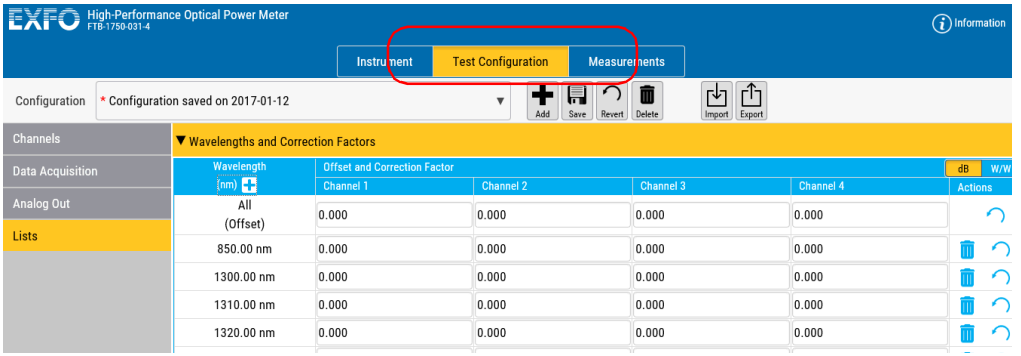
.
4. Enter a name for the configuration.



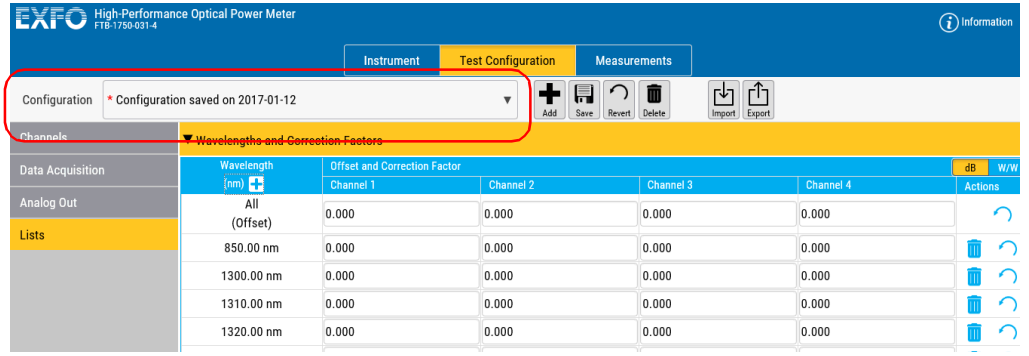
5. Confirm your choice.

To delete a configuration:

1. Select the **Test Configuration** tab.



2. Select the configuration you want to delete.



3. Click 

.

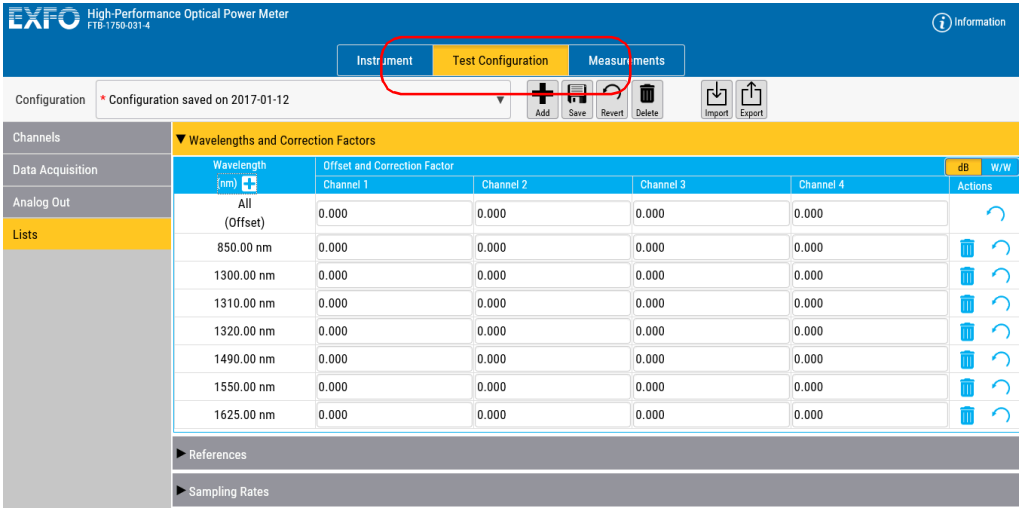
4. Confirm your choice.

To revert to the current configuration and erase changes:

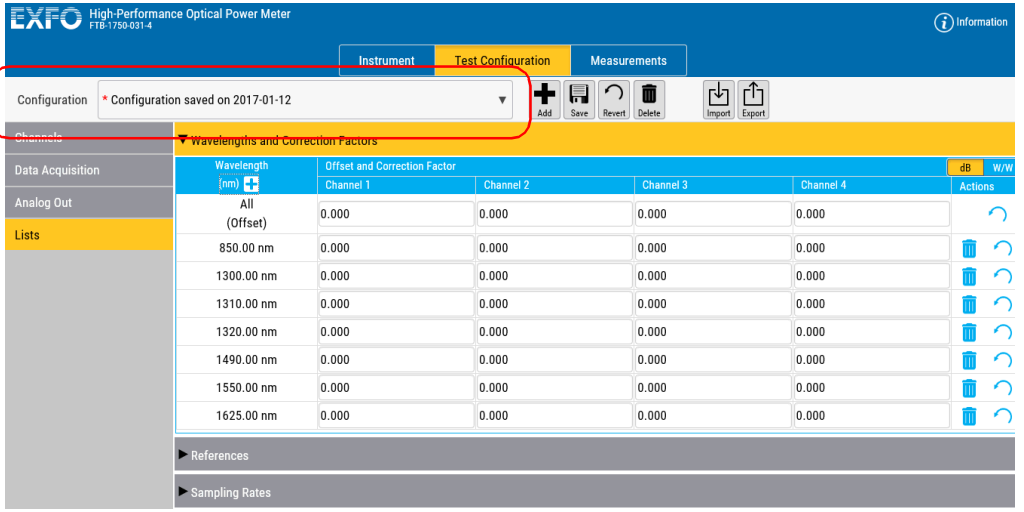
1. While in the **Test Configuration** tab, click Revert.
2. Confirm your choice.

To export a configuration:

1. Select the **Test Configuration** tab.



2. Select the configuration you want to export.



3. Click 

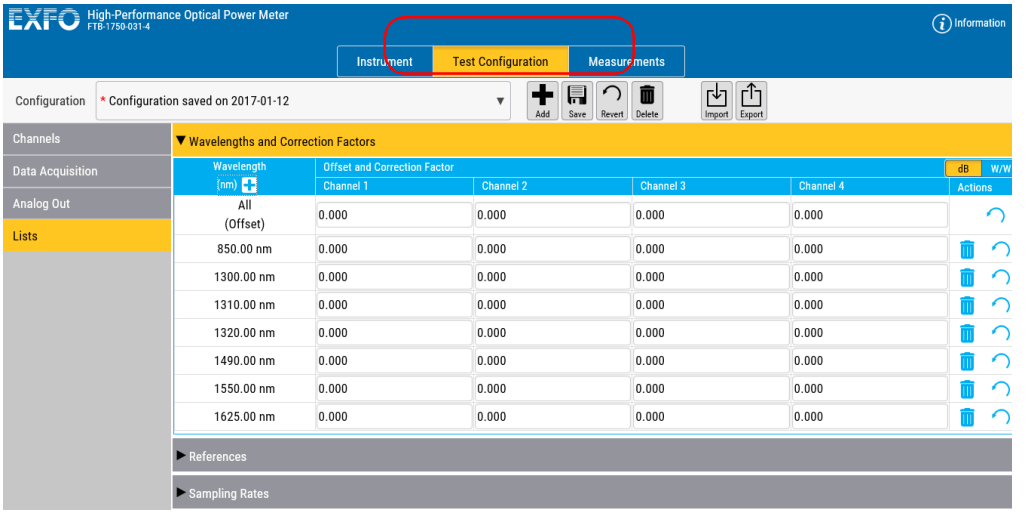
.

4. Select the location for the file and change the name if needed.

5. If you have changed the name or location, click **Save** to confirm your export.

To import a configuration:

1. Select the **Test Configuration** tab.



2. Click 

.
3. Locate the configuration files that you want to add and click **Open**.

4 Preparing Your High-Performance Power Meter for a Test

The OHS-1700 Optical Head can be used with connectorized or nonconnectorized fiber (using the FOA-3000 and BFA-3000 Bare Fiber Adaptor). Each head has its own port, onto which you can connect a fiber.

Ensure you use the appropriate adaptors such as the FOA-3000 or the BFA-3000 to combine your power meter to the optical head. You also have to clean optical fibers properly before connecting them to your unit.

Cleaning and Connecting Optical Fibers

IMPORTANT

To ensure maximum power and to avoid erroneous readings:

- **Always inspect fiber ends and make sure that they are clean as explained below before inserting them into the port. EXFO is not responsible for damage or errors caused by bad fiber cleaning or handling.**
- **Ensure that your patchcord has appropriate connectors. Joining mismatched connectors will damage the ferrules.**

To connect the fiber-optic cable to the port:

1. Inspect the fiber using a fiber inspection scope (or probe). If the fiber is clean, proceed to connecting it to the port. If the fiber is dirty, clean it as explained below.
2. Clean the fiber ends as follows:
   - **2a.** Gently wipe the fiber end with a lint-free swab dipped in optical-grade liquid cleaner.
   - **2b.** Use a dry swab to dry the connector completely.
   - **2c.** Visually inspect the fiber end to ensure its cleanliness.

3. Carefully align the connector and port to prevent the fiber end from touching the outside of the port or rubbing against other surfaces.

   If your connector features a key, ensure that it is fully fitted into the port's corresponding notch.

4. Push the connector in so that the fiber-optic cable is firmly in place, thus ensuring adequate contact.

   If your connector features a screw sleeve, tighten the connector enough to firmly maintain the fiber in place. Do not overtighten, as this will damage the fiber and the port.

Note: *If your fiber-optic cable is not properly aligned and/or connected, you will notice heavy loss and reflection.*

EXFO uses good quality connectors in compliance with EIA-455-21A standards.

To keep connectors clean and in good condition, EXFO strongly recommends inspecting them with a fiber inspection scope (or probe) before connecting them. Failure to do so may result in permanent damage to the connectors and degradation in measurements.

Connecting the Optical Head to the Power Meter

To connect the optical head to the optical head interface, use the provided cable. Ensure that the connector key is aligned with the port's corresponding notch; once the key and pins are properly aligned, the connection should be made easily.

CAUTION

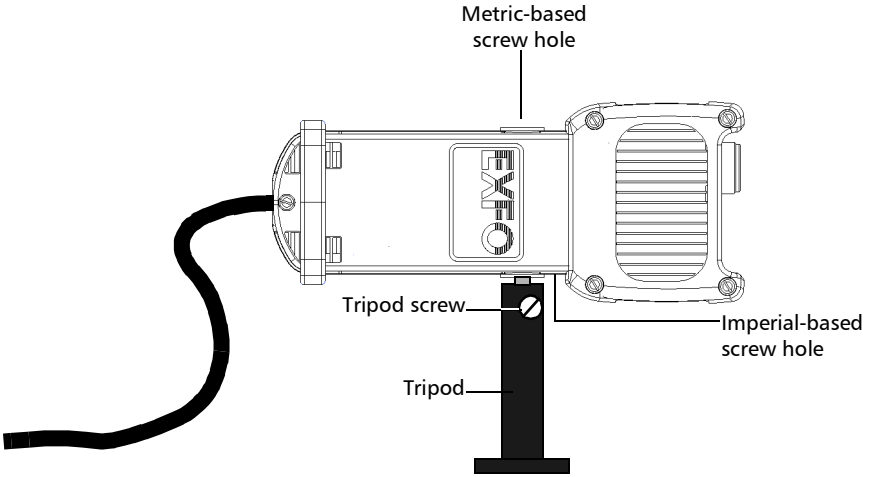
Do not force the connector into the port if the pins do not seem to be correctly aligned with the corresponding holes. Forcing the connector could permanently damage the pins.

Once you have connected the optical head to the interface and started the application, you should see the channel or channels (on a multiple-channel power meter) in the data display.

If the optical head is not connected to its channel, you will notice that the display is different and you cannot perform measurements on this channel until you have connected the head properly.

Securing the Optical Head onto Your Work Surface

Your OHS-1700 Optical Head can be used with a tripod. A metric-based screw hole is located on the left side of the head and bears the inscription “M6 X 1” and an imperial-based screw hole is located on the right side and bears the inscription “1/4-20”.



Once you have installed the head onto the tripod, tighten the tripod screw to prevent it from turning; which would compromise your test results.

Nulling Offsets

Temperature and humidity variations affect the performance of electronic circuits and optical detectors, which can offset measurement results. To compensate for this offset, the unit is equipped with an offset nulling function.

Your unit is designed not to require offset nulling under normal operation, but you should perform it whenever environmental conditions change significantly or when measuring very low power values.

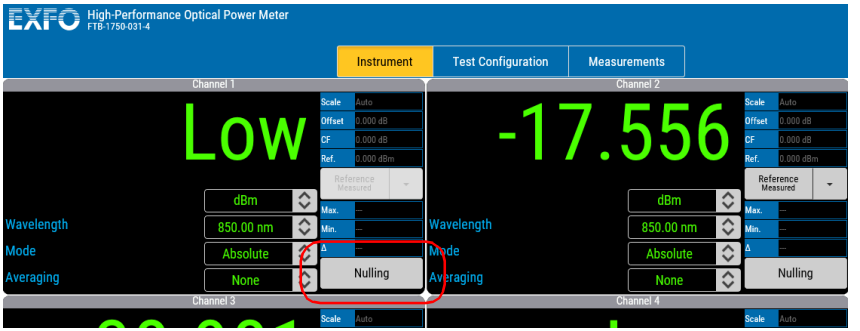
Note: *The manual nulling offset is valid for the* current *test session only; it no longer applies when you turn off your power meter.*

IMPORTANT

Light must not reach the detector when performing an offset nulling operation. Always use a protective screw cap.

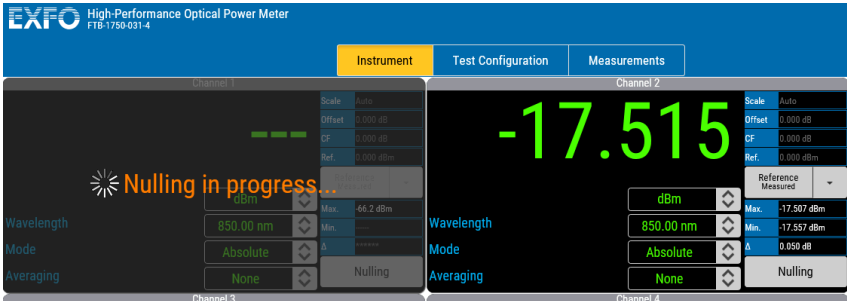
To perform an offset nulling on one channel:

1. Install the protective cap over the detector port.
2. Under the desired channel, click **Nulling**. A message prompts you to ensure that the detector cap is properly installed.



3. Select **Start Nulling** to perform the offset nulling, or **Cancel** to exit.

   A message appears in the window of the channel for which you are performing a nulling.

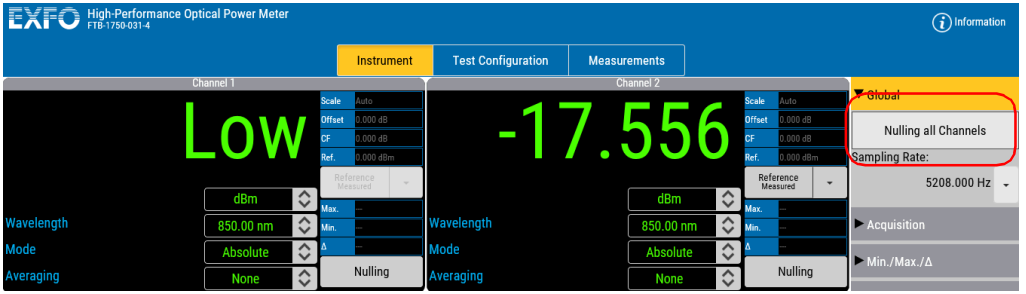


Note: *Offset nulling values are applied to the channel until a new nulling is performed.*

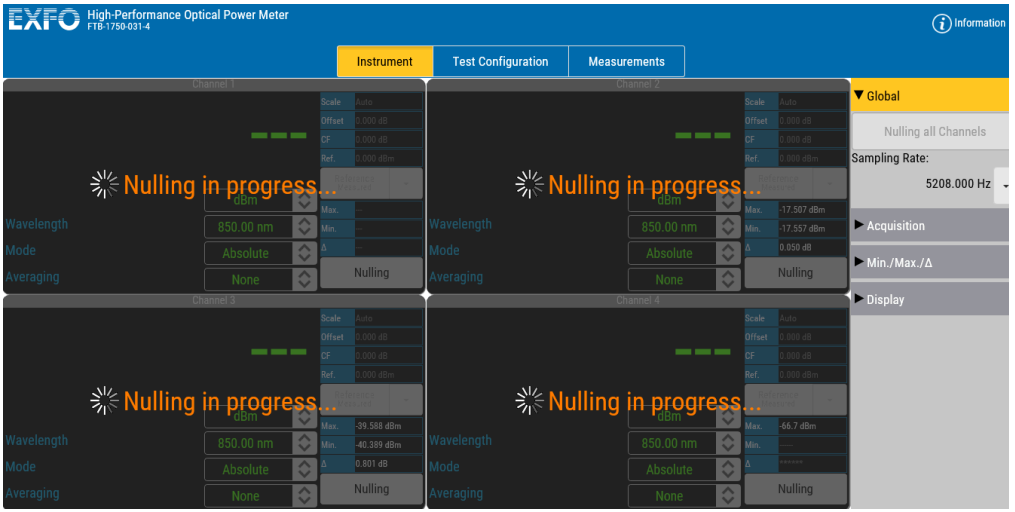
To perform an offset nulling on all channels (two- and four-channel power meters):

1. Install the protective caps over all of the detector ports.
2. Under **Global**, click the **Nulling All Channels** button.

   Offset nulling values are applied to the channel until a new nulling is performed. A message prompts you to ensure that the detector caps are properly installed.



3. Click **Start Nulling** to perform the offset nulling, or **Cancel** to exit. A message appears to indicate that nulling is in progress.



5 Measuring Power

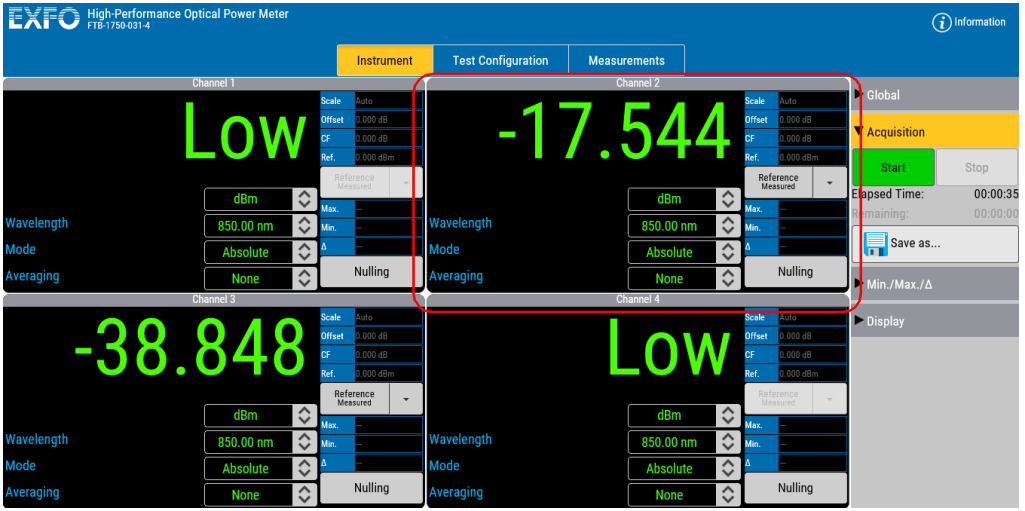
Power measurements can be displayed in two modes:

- absolute
- relative

It is also possible to use a correction factor at specific wavelengths and to add an offset value to your power measurement.

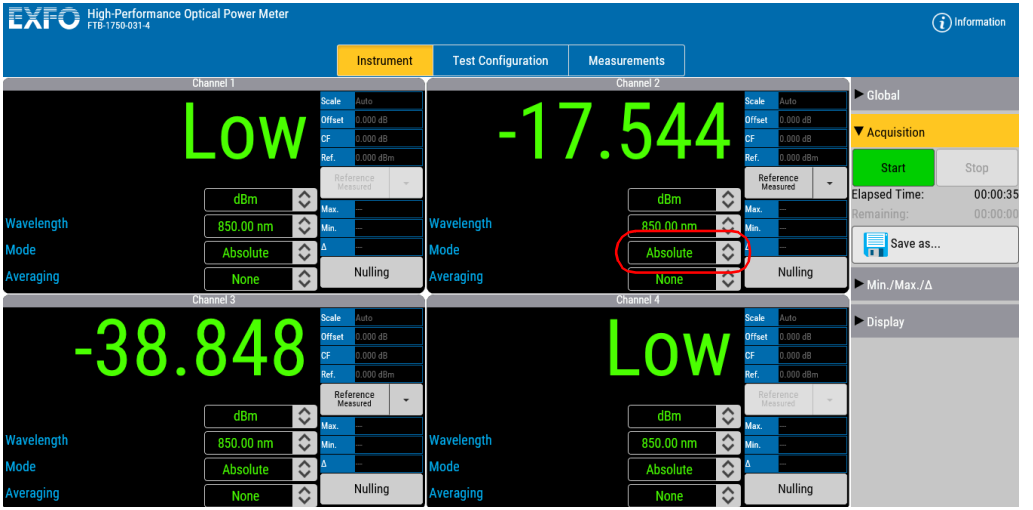
Displaying Absolute Power

When in absolute power, measured values are displayed in either dBm or W units (pW, nW, µW, mW...) and the displayed value represents the absolute optical power reaching the detector within specified uncertainty.



To display absolute power:

From the **Instrument** function tab, select Absolute as the mode to use.



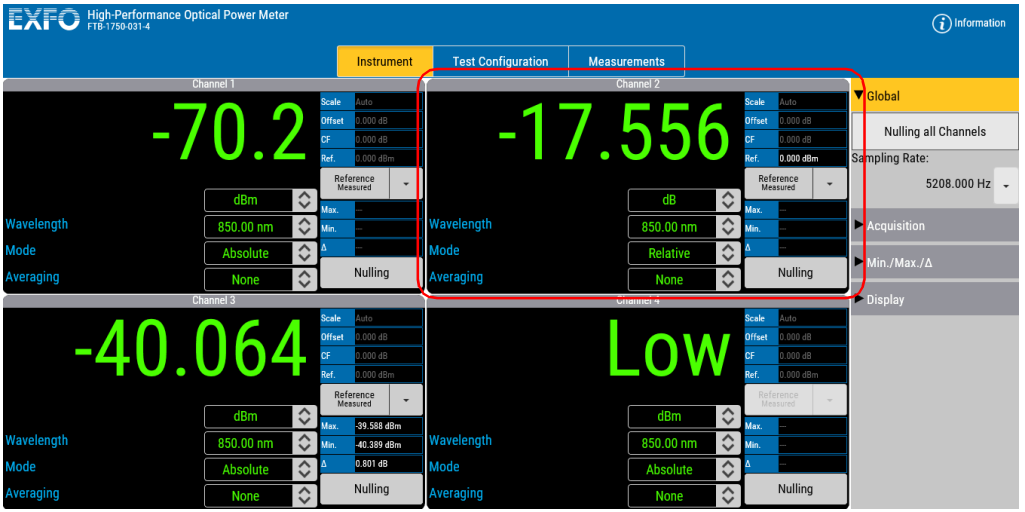
An absolute power measurement in negative W units indicates that the nulling of the offset was not done properly. If this happens, repeat the offset nulling operation (see *Nulling Offsets* on page 33).

Measuring Relative Power

Power measurements can be displayed as a deviation from an absolute reference value. The relative power is particularly useful when performing loss measurements.

Relative power is displayed in dB when the reference value is measured in dBm. In this case, the value will be either positive or negative, as the actual measured power is higher or lower than the reference power.

If the reference value is in W, the relative power will be displayed in W/W. In this case, the relative power is the deviation ratio from the reference.



To display significant relative power values, it is important to have an appropriate reference value. You can either apply the current module power as a reference or edit a value to be used as the reference.

To activate the relative power mode:

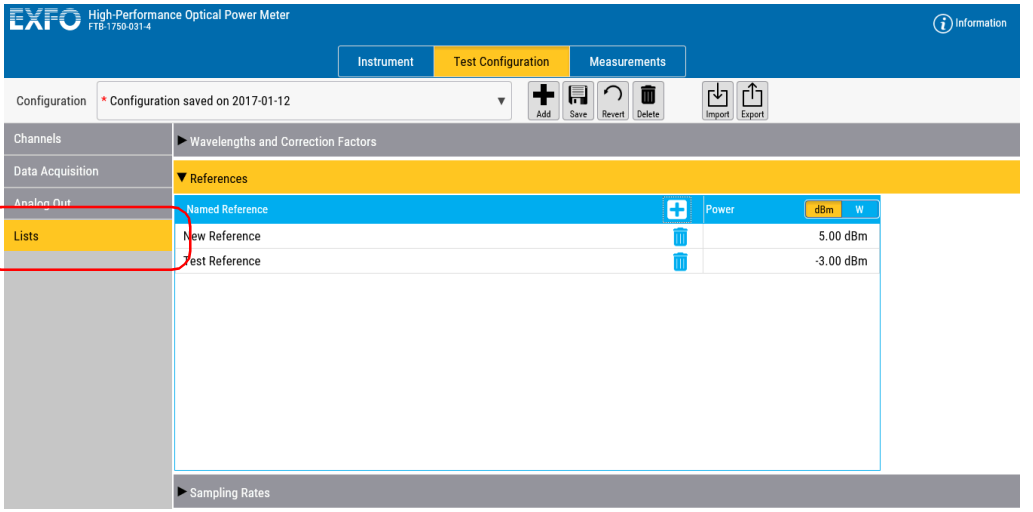
From the **Instrument** function tab, select Relative as the mode to use.

Editing the Reference List

The **Reference** list can be changed to adapt to your testing requirements.

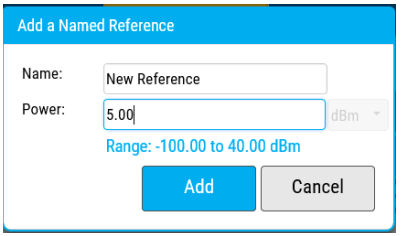
To add a reference to the list:

1. From the **Test Configuration** function tab, select the **Lists** tab, then **References**.



2. Under **Named Reference** list, click to add a new reference value.

3. Enter a name for your reference, then the desired value and unit to use.



4. Click **Add** to enter the value.

To delete a user reference from the list:

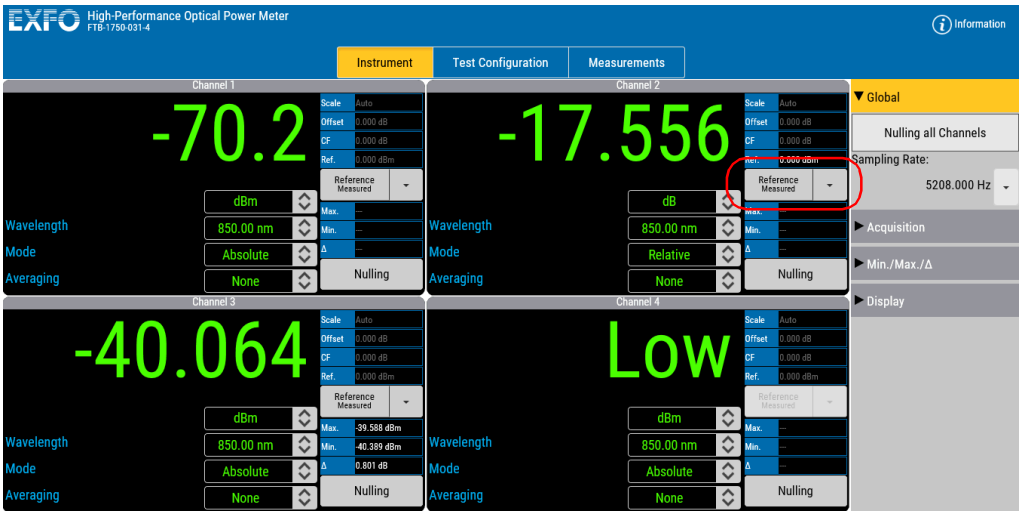
1. From the **Test Configuration** function tab, select the **Lists** tab, then **References**.
2. Select the value to remove by clicking it once.
3. Click  to remove the value, then confirm your choice.

Selecting the Reference Value

The reference value influences your measurements once selected and activated. Whether you select the current module's power or a set value from the list, this becomes the basis for your future acquisitions.

To select the reference value:

From the **Instrument** tab, in the section corresponding to the channel you want to apply a reference to, use the drop-down list to select either the measured reference, or a named reference from your list.



Measuring Corrected Power

Applying a correction factor to the measured power is useful when compensating for known inaccuracies (power gains or losses) at specific wavelengths.

A correction factor (CF) can be applied to any measurement that is displayed in either dB, dBm, W, or W/W.

When a dB correction factor different from 0.000 is defined, the displayed power is equal to the actual power plus the value of the correction factor. When a W/W correction factor different from 1.000 is defined, the displayed power is equal to the actual power times the value of the correction factor.

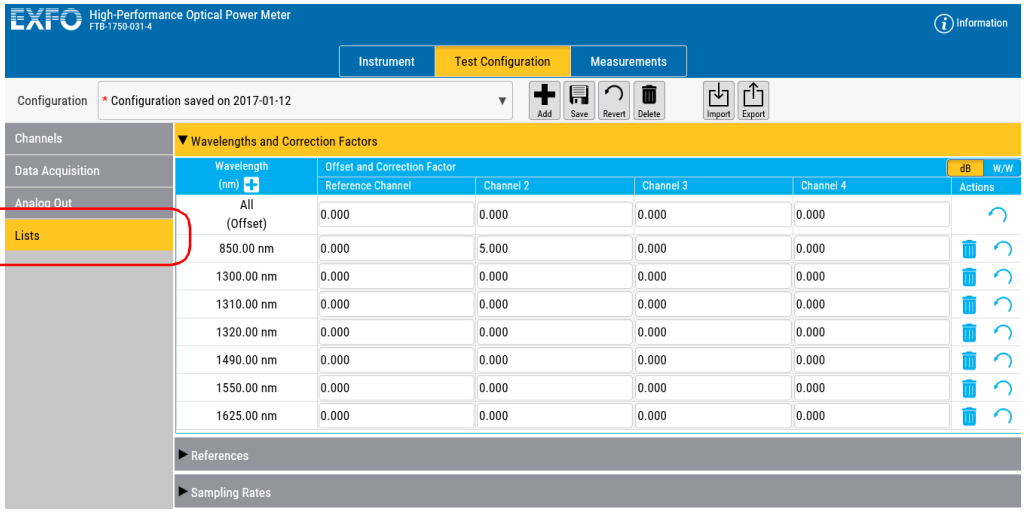
Note: *With an active correction factor, the CF marker appears in the data display for the matching channel.*

Note: *Special care must be taken when setting a CF as it emulates a new calibration (the module calibration is not affected and will be restored by setting back the CF to a null value).*

When expressed in dB, the CF can be a positive or negative value. When the currently selected measurement unit is W, the correction factor is expressed in W/W, indicating a multiplication factor for the current wavelength and channel. The CF expressed in W/W will always be a positive value.

To set a correction factor:

1. From the **Test Configuration** function tab, select the **Lists** tab.



2. Select **Wavelengths and Correction Factors**.

3. Go down the list of wavelengths until you reach the one for which you want to apply a correction factor. If the wavelength is not in the list, you can add it as explained in *Managing Wavelength Lists* on page 16.

4. In the channel for which you want to set the correction factor (in the case of a two- or four-channel power meter), enter the desired correction factor value, between –30.0 dB and 30.0 dB, or between 0.001 W/W and 1000.0 W/W.

Note: *Although the wavelength list applies to all channels, the CF applies to the wavelength and channel at which it was set.*

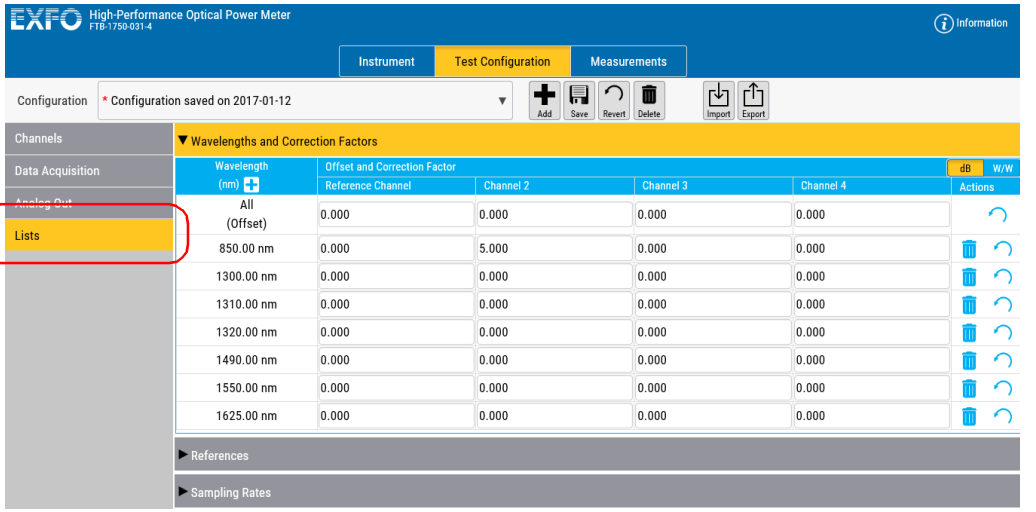
To remove the offset from a wavelength, simply remove the value you have entered.

Using the Offset Function

The offset function is used when you want to take into account, in the power displayed, a known gain or loss in the link that is not already included in the signal reaching the detector. Contrary to the correction factor, which applies to a specific wavelength, the offset value applies to any wavelength when it is enabled in a specific channel.

To enter an offset value:

1. From the **Test Configuration** function tab, select the **Lists** tab.



2. Select **Wavelengths and Correction Factors**.
3. Select the channel for which you want to set the offset if you are using a multichannel power meter.
4. In the **All (Offset)** row, enter the desired value.

Averaging Measurements

When the averaging function is enabled on the High-Performance Power Meter, the most recent measurement samples, for which you can set the number, are used to compute an unweighted mean of the previous in samples. This average is displayed as the measured value.

Averaging can be done on a minimum of 2 and a maximum of 1000 points. The calculation uses watt as unit, but the result will be converted into the unit you have selected for your acquisition (W, W/W, dBm or dB) afterwards.

The formulas used to calculate measurement averaging depend on the number of the accumulated samples.

If n ≥ M, then

$$P_{avg} = \frac{\sum_{i=0}^{W-1} P_{n-i}}{W}$$

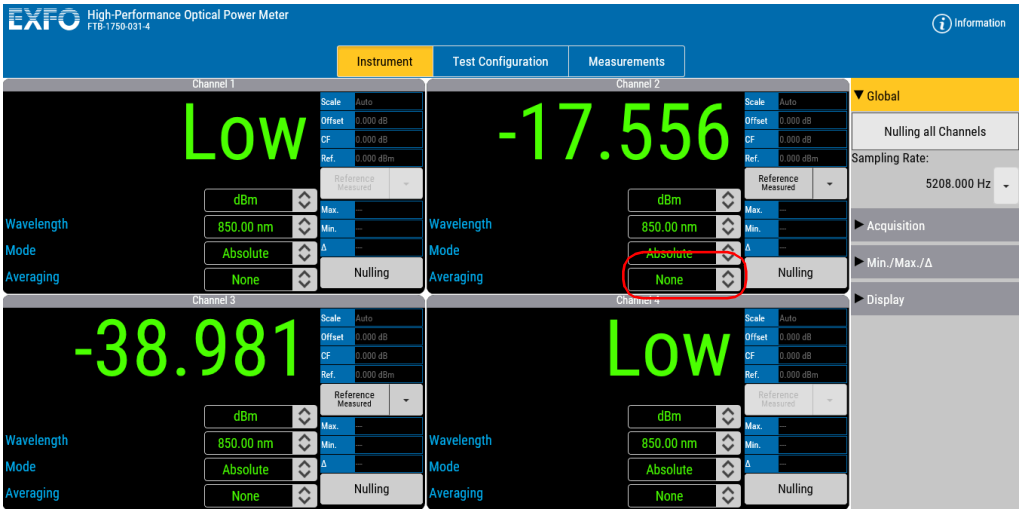
Where

- W is the width of the window (averaging size)
- n is the index of the most recent sample

Note: *When measurement conditions change, the number of accumulated samples is reset to zero in order to start a new averaging measurement with the new settings.*

To select the averaging mode:

From the **Instrument** function tab, use the arrow button to change the value in the **Averaging** list. You can also enter a specific value as required.



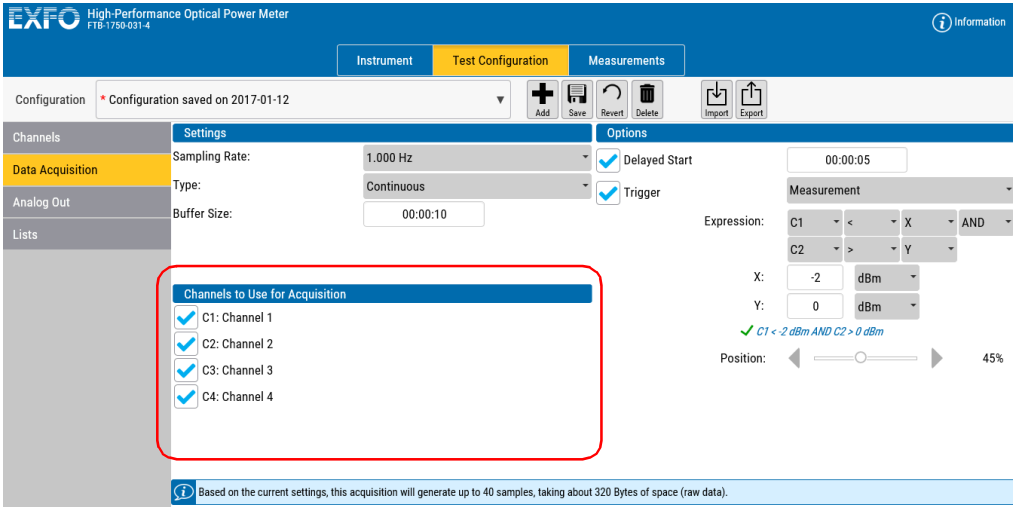
6 Performing Acquisitions

Acquisition are lists of samples. When you start an acquisition, samples will be added to it at a certain sampling rate. You can perform your acquisition on one or several channels at the same time (in the case of multichannel power meters).

For all acquisition types, the acquisition size is determined by the rate at which new values are produced and the programmed duration of the acquisition. It is limited to 10 M samples per channel (therefore, a 4-channel acquisition is limited to 40 M samples).

To select which channel will be included in your acquisition:

1. From the **Test Configuration** function tab, select the **Data Acquisition** tab.
2. Under **Channels to Use for Acquisition**, select which channel or channels you want to include.



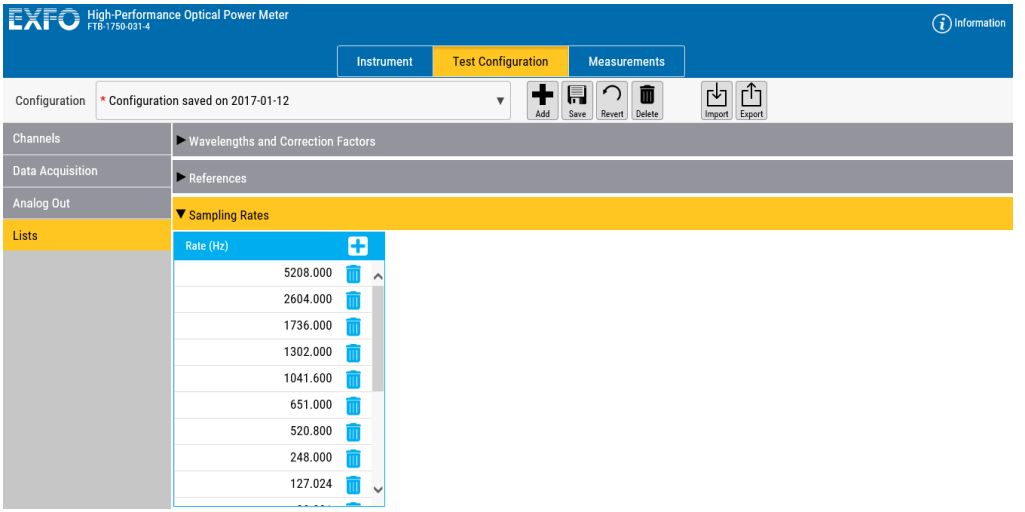
You can set a location where the acquisitions will be stored when you do your tests.

Editing the Sampling Rate List

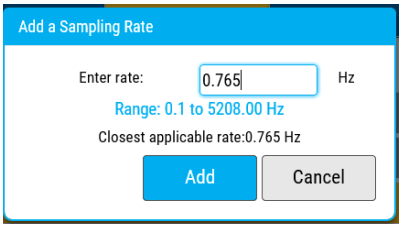
To select the frequency at which your continuous or single acquisition will be performed, use a value which is a divider of the full frequency value, 5208 Hz. The values available to you are listed in the **List**s tab of the **Test Configuration** function tab.

To enter a new sampling rate:

1. From the **Test Configuration** tab, select **Lists**, then **Sampling Rates**.



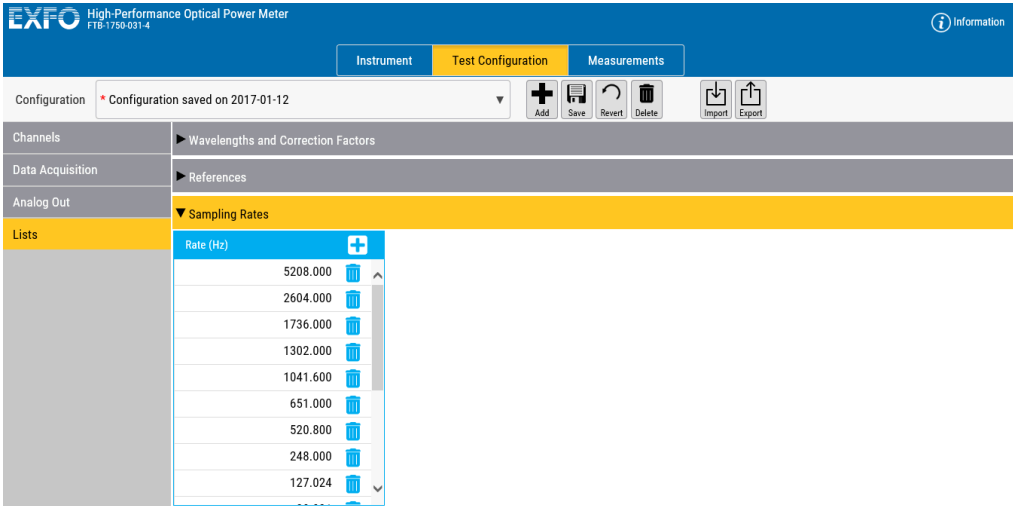
2. Click  , then add the new value.



3. Click **Add** to confirm the addition.

To remove a rate from the list:

1. From the **Test Configuration** tab, select **Lists**, then **Sampling Rates**.



2. Select the desired frequency by clicking on it once.
3. Click , then confirm your choice.

Selecting the Acquisition Type

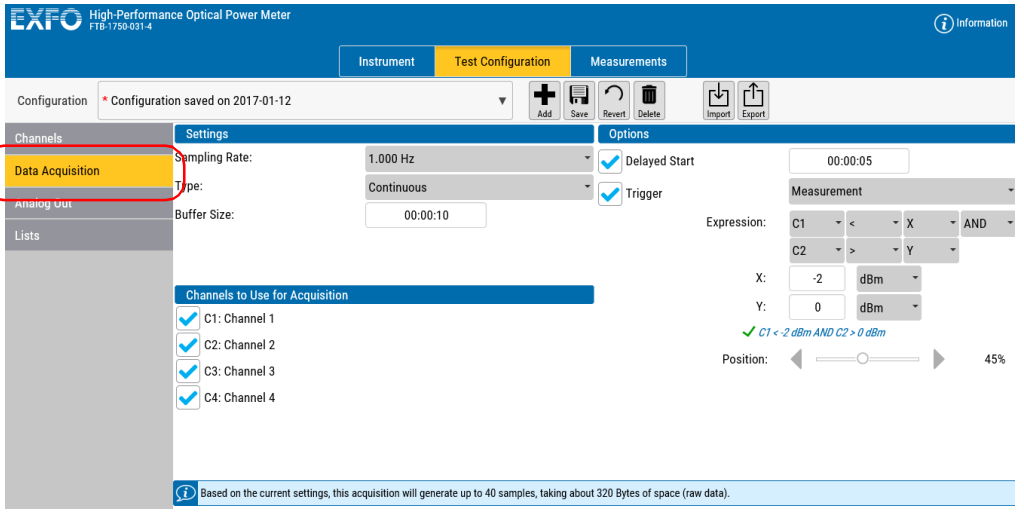
You can perform different types of acquisitions with your power meter:

- **Continuous:** the acquisition will run continuously until stopped by the user. You can select a rate that will optimize instrument flexibility and measurement stability as well as determine the quantity of data generated during data acquisition.
- **Single:** power measurements will be taken once, at the rate you have selected. This type of acquisition is particularly useful for triggered acquisitions when waiting for specific conditions.
- **Interval:** interval acquisitions are exactly like continuous acquisitions, except that new values are added to the acquisition at certain intervals, instead of the sampling rate. For example, if the sampling rate is 1 s and the interval 10 s, every ten seconds, the current 1 s sample is added to the acquisition. The interval can be specified in hh:mm:ss and is limited to 1 hour.

In each case, measurements are taken at the selected sampling rate and can be saved to a user-specified data file. The size of the data files created during acquisition is proportional to the sampling rate and duration of the acquisition. Higher sampling rates and longer durations generate larger quantities of data.

To select a acquisition type:

1. From the **Test Configuration** function tab, select the **Data Acquisition** tab.



2. Select the acquisition type by using the list of available choices.
3. Select the rate to use with the arrow buttons. The acquisition sampling rate will have priority over the display sampling rate (under the **Global** tab of the **Instrument** function tab) for the duration of the acquisition.

Note: *Use a lower sampling rate with averaging set to active (see* Averaging Measurements *on page 45) for greater repeatability when measuring very low power.*

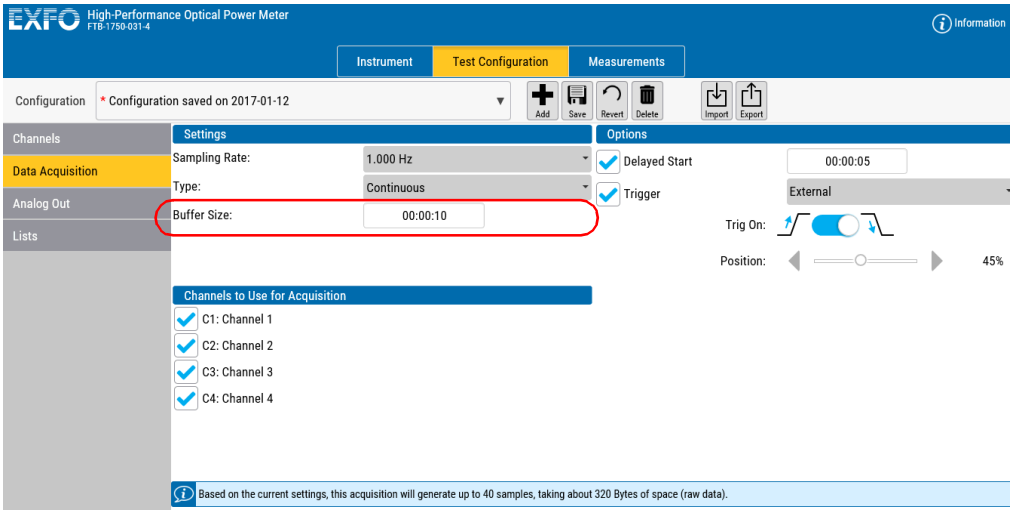
If you select **Interval**, enter the duration as hh:mm:ss to use as the interval at which samples will be added to the acquisition. In this mode, samples are still produced at the acquisition sampling rate, but they are added to the acquisition at the sampling interval. It is thus possible to have a 1-second sampling rate with an interval of 60 seconds, as the acquisition will add a one-second sample every 60 seconds.

Using a Duration for Your Acquisition

You can determine a set duration for your acquisition using a timed buffer. The acquisition will stop once the time was spent.

To include a duration for your acquisition:

1. From the **Test Configuration** function tab, select the **Data Acquisition** tab.
2. Under **Settings**, enter the duration.



Selecting Acquisition Options

The acquisition can be started using different actions, either used individually or together:

- Delayed start: The acquisition starts at a specified time after you start the process, and continues for the time you have previously specified.
- Trigger: Data recording begins when a specified condition is met. The trigger will be either external, or use the measurements on your unit with specific conditions. These conditions are explained in the following table, where A and/or B represent the channel on which the condition is to be met, and x and/or y represent the desired power level threshold.

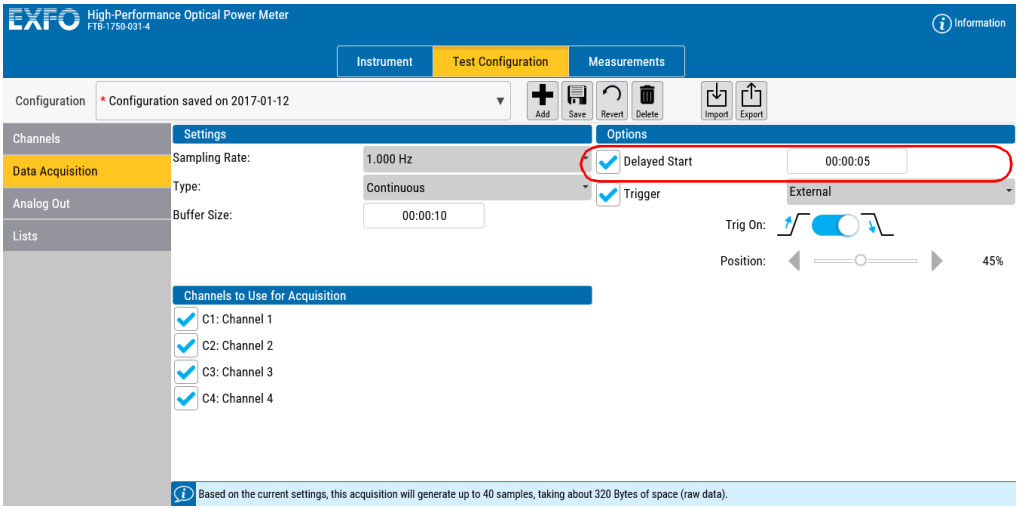
Trigger	Description
A > x	Acquisition will start when measured power is greater than the specified x value.
A < x	Acquisition will start when measured power is lower than the specified x value.
A > x AND A < y	Acquisition will start when measured power in channel A is inside the interval set by the values x and y.
A or B < x	Acquisition will start when power in either channel A or channel B is lower than the specified x value.
x < A or B < y (multichannel power meters only)	Acquisition will start when measured power in channel A goes over a specified value (A > x). OR Acquisition will start when measured power in channel B falls under a specified value (B < y).
A < B (multichannel power meters only)	Acquisition will start when measured power of channel A is lower than measured power of channel B.

Note: *The trigger defines the condition for starting data acquisition. Once begun, acquisitions will continue for the specified duration, regardless of the measured power.*

Note: *The trigger will work even when the signal is outside the normal range. For example, a signal that is too weak could start the acquisition since the power is lower than the specified value.*

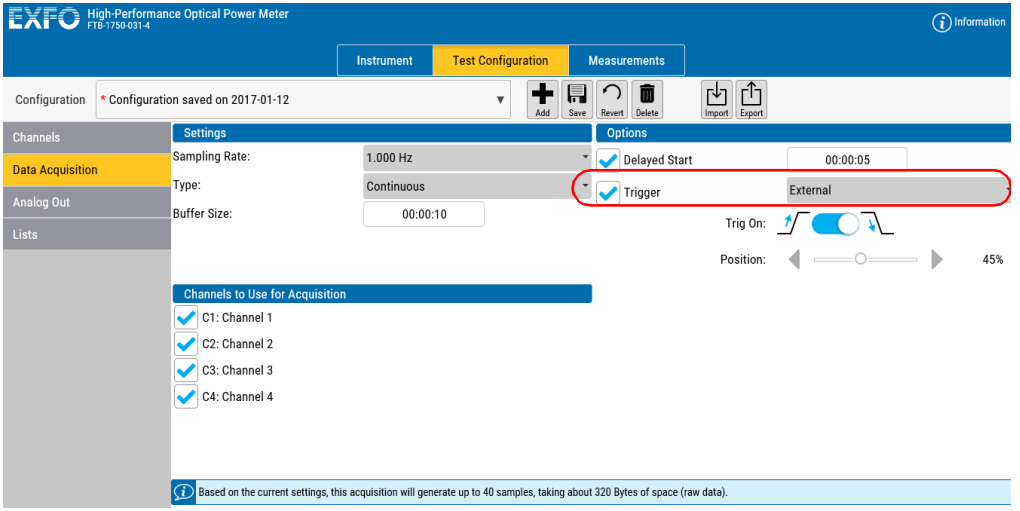
To set a delay for your acquisition:

1. From the **Test Configuration** function tab, select the **Data Acquisition** tab.
2. Under **Options**, select **Delayed start**, then enter the delay value you want to use.



To set up an acquisition with an external trigger:

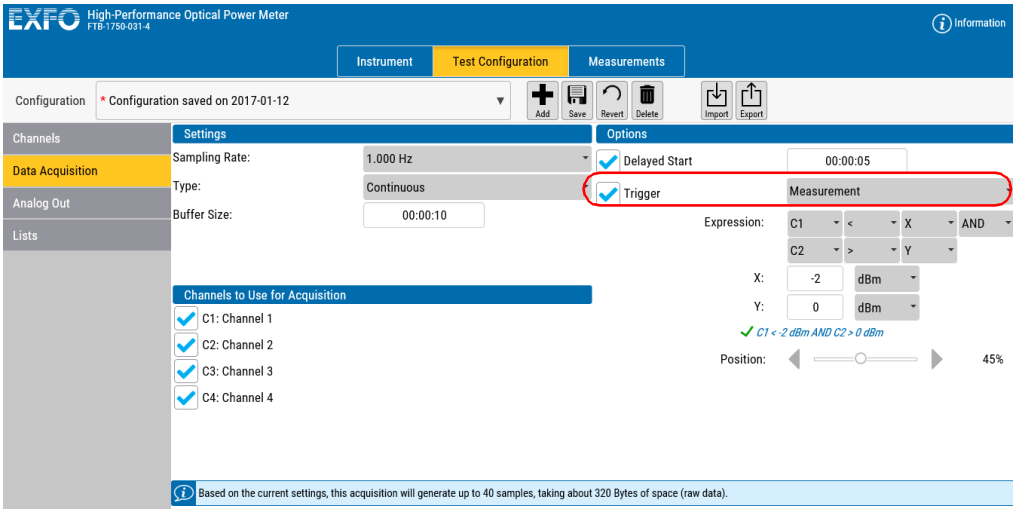
1. From the **Test Configuration** function tab, select the **Data Acquisition** tab.
2. Under **Options**, select **Trigger**.
3. Select **External** as the type.



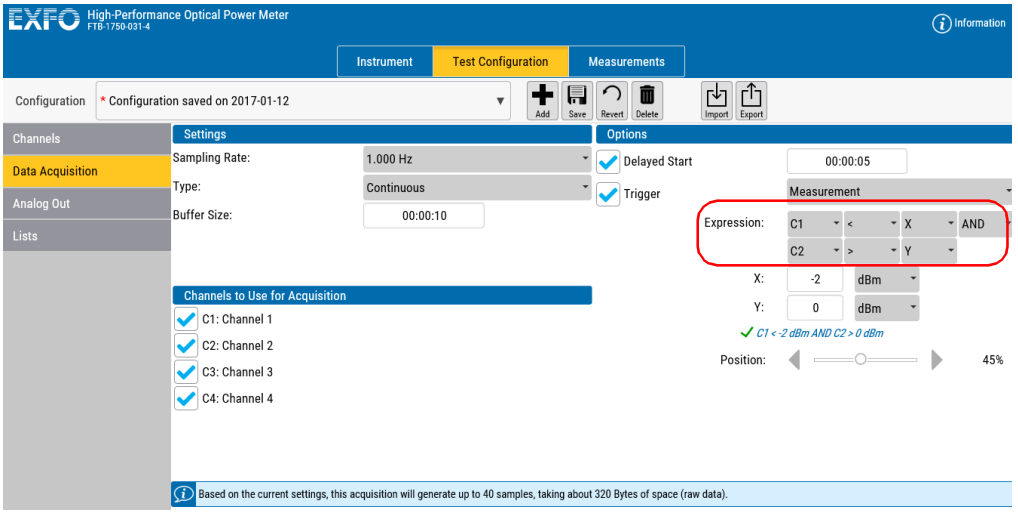
4. Select whether the acquisition will be taken on the positive or negative edge.
5. Enter the value of the position on the edge where the data will begin to be acquired in the buffer when the trigger occurs.

To set up a measurement-based triggered acquisition:

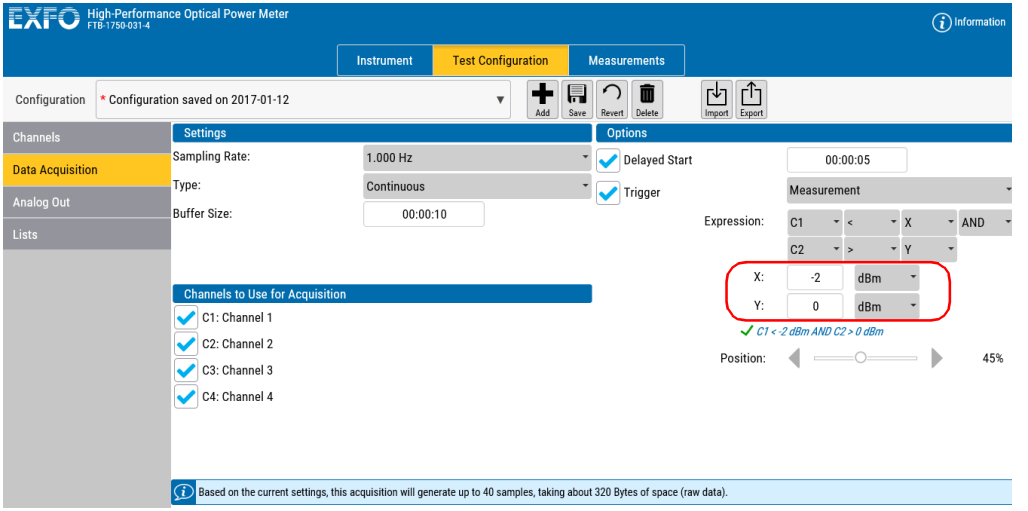
1. From the **Test Configuration** function tab, select the **Data Acquisition** tab.
2. Under **Options**, select **Trigger**.
3. Select **Measurement** as the type of trigger that will be used.



4. Depending on whether you have one or two power types in your trigger, select which channels will be used to take the measurement, then enter the expression corresponding to the desired trigger.



5. Enter the power threshold for the trigger in the corresponding boxes.



Starting the Acquisition

Once you have set your parameters, you can start the acquisition.

To start an acquisition:

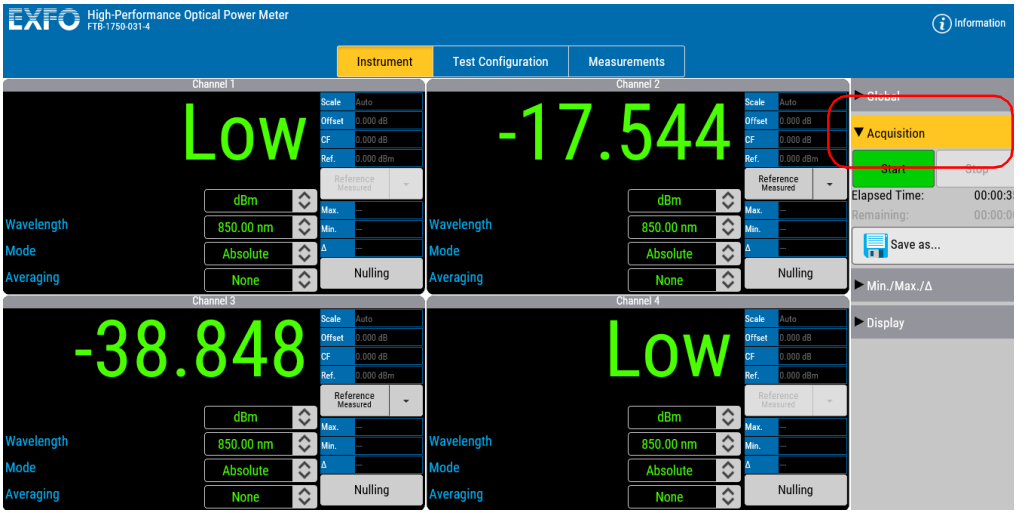
1. Select the **Instrument** function tab.
2. From the **Acquisition** tab, click **Start**.

Data acquisition can be terminated at any time by clicking **Stop**. The accumulated data is available in the data file.

Once the acquisition is complete, or if you have stopped it manually, you can save the results to a file.

To save the acquisition:

1. Set up and perform the acquisition.
2. From the **Instrument** function tab, select the **Acquisition** tab.



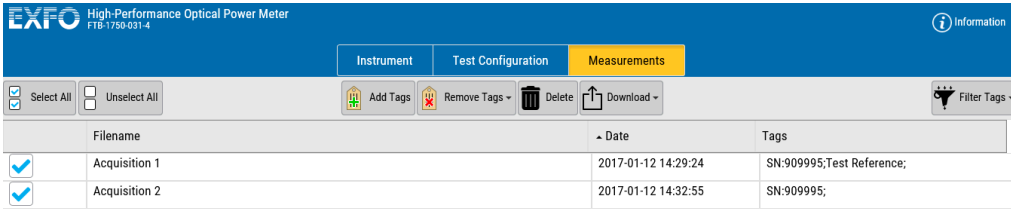
3. Click **Save As**.
4. Enter a name for your acquisition, then click **Save**.

   The file will now be available in the **Measurements** function tab.

Managing Acquired Data

Once you have acquired data, you can identify it and add tags to it so that it is easy to sort, and export it to .csv format for post processing.

The files are added automatically to the list as the acquisitions are performed by your unit.

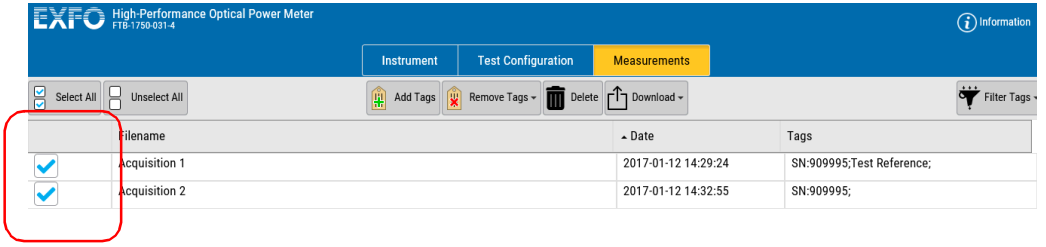


Managing Tags

Tags can help you regroup files that share common features or content. You can add more than one tag to a file and you can add the same tag to several files at a time.

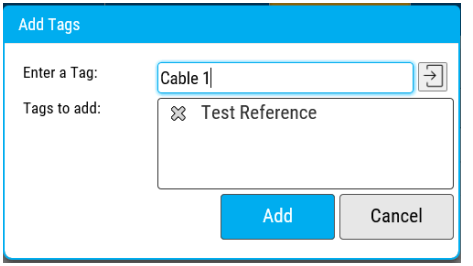
To add a tag:

1. Select the **Measurements** function tab.
2. Select one or several files in the list.



3. Enter a name for your tag, then hit the Return key to include it in the list. You can add as many as you want.

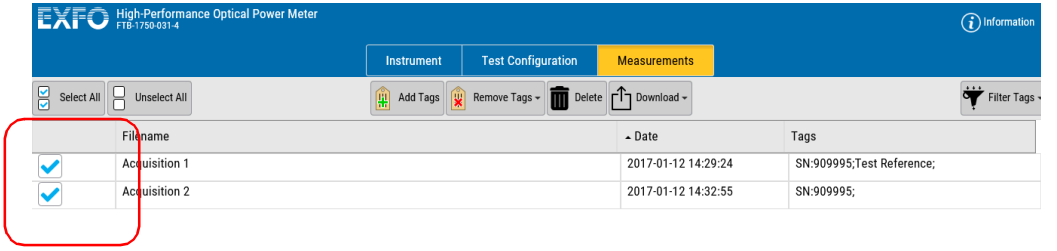
   If you want to remove a tag from the list, click the corresponding X on the left.



4. Once you are done adding the tags, click **Add**.

To remove tags from the files:

1. Select the **Measurements** function tab.
2. Select one or several files in the list.



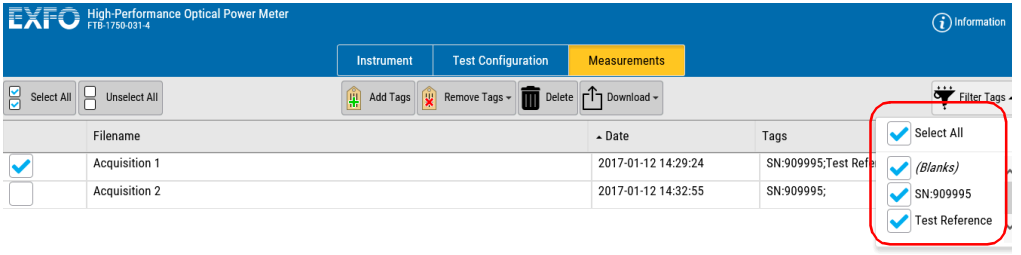
3. Click **Remove Tags**, then select which tag or tags you want to remove from the list of available choices.
4. Click **Remove**.

Using Filters

You can use the tags as filter to display only the relevant files.

To use the tags as filters:

1. Select the **Measurements** function tab.
2. Click **Filter Tags** and check the corresponding terms you want to view in the list.



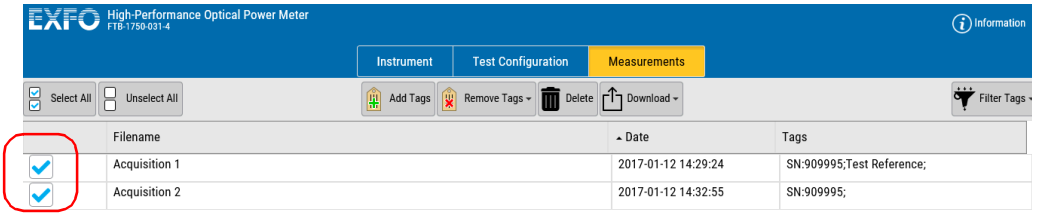
The list is updated automatically.

Deleting Files

You can delete files you do not need anymore to free up space.

To delete unwanted files:

1. From the **Measurements** function tab, select the file or files to delete in the list.



2. Click 

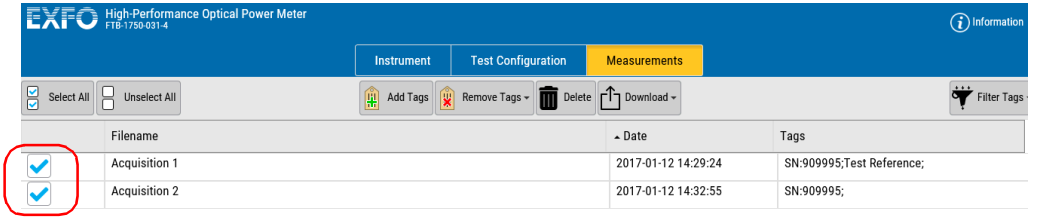
.
3. Confirm your choice.

Exporting Files

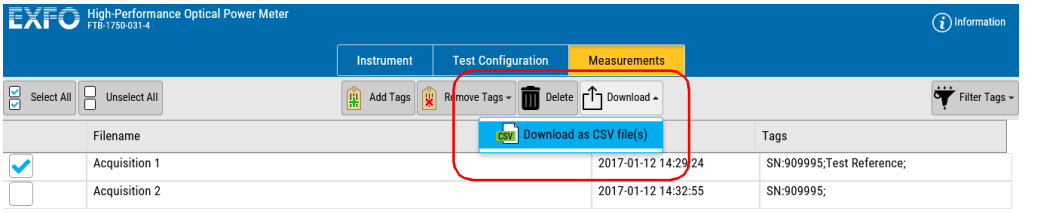
Once you have filtered the files you want, you can export them to the .csv format for future consultation.

To export your files:

1. From the **Measurements** function tab, select the file or files you want.



2. Click **Download**, then select which format you want to use.

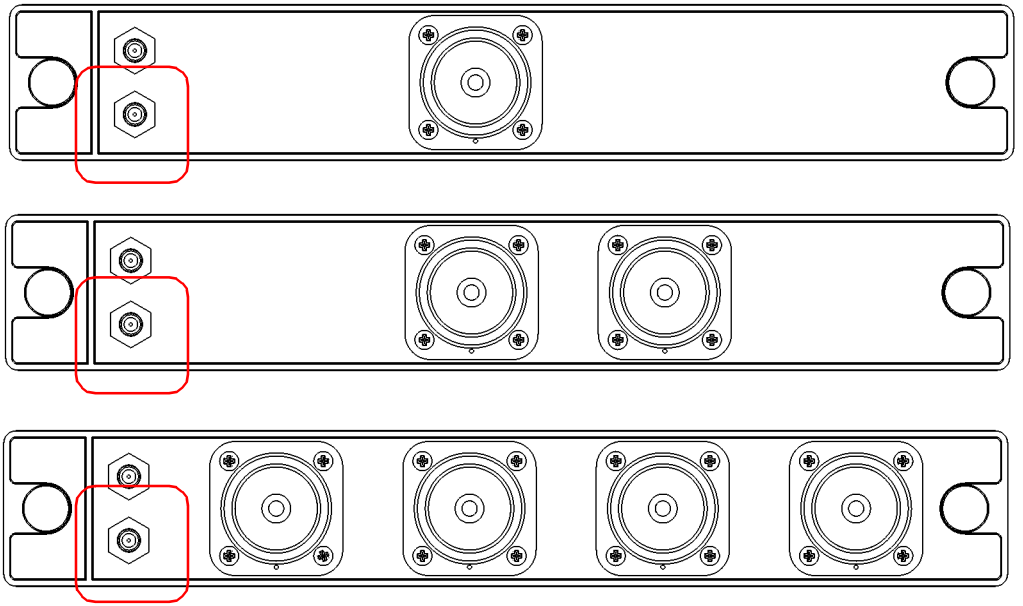


3. Select a name and location for your file, then click **Save**.

7 Using the Analog Outputs

The analog outputs (SMB connectors) are accessible from the front panel of your power meter module.

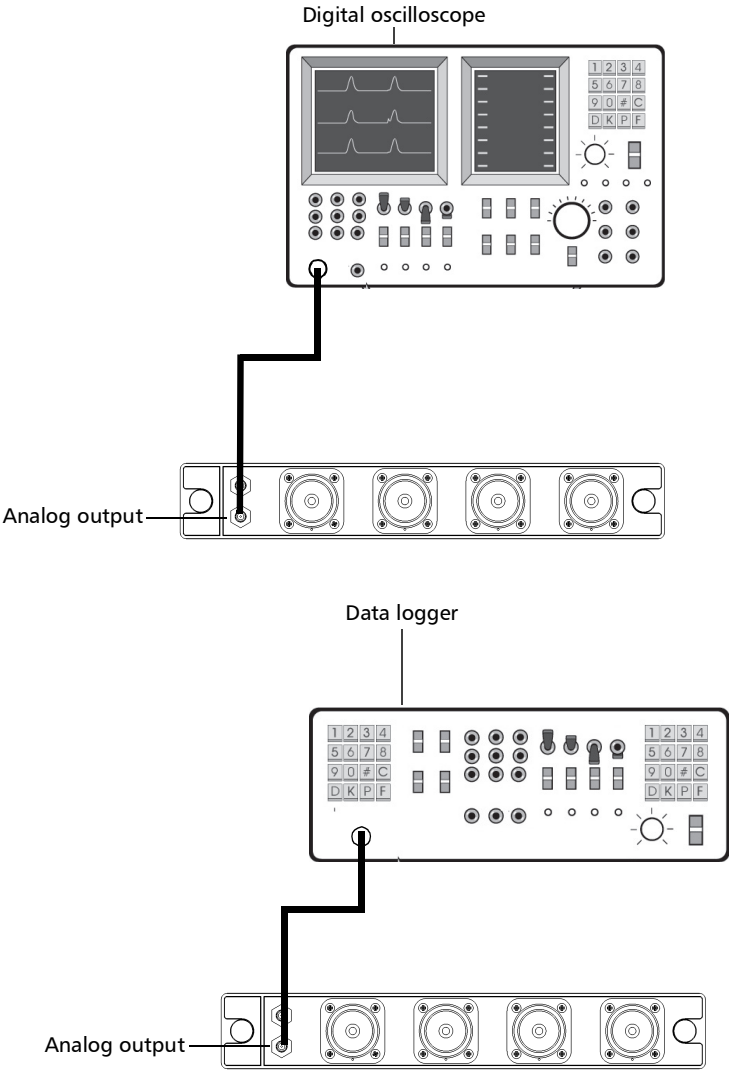
Note: *The analog output feature is not available on the OHS models.*



The analog output provides an electrical signal proportional to the optical power input on the detector (which is the measured value shown in the display of the **Instrument** function tab).

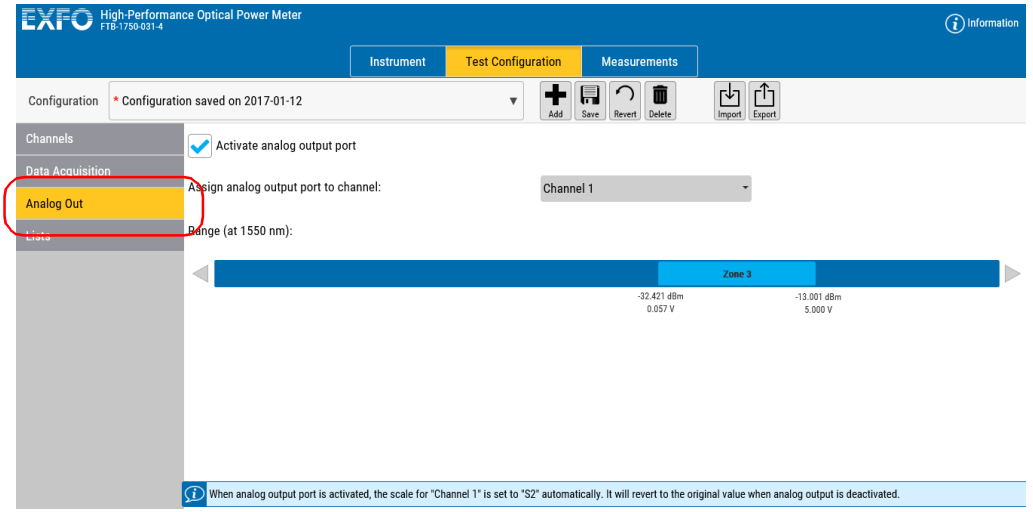
The analog output is automatically associated with channel 1 for a one-channel power meter. However, if you are using a multichannel power meter, you can use any of the channels and associate it with the analog output according to your needs.

The following is an illustration of typical uses of the analog output.

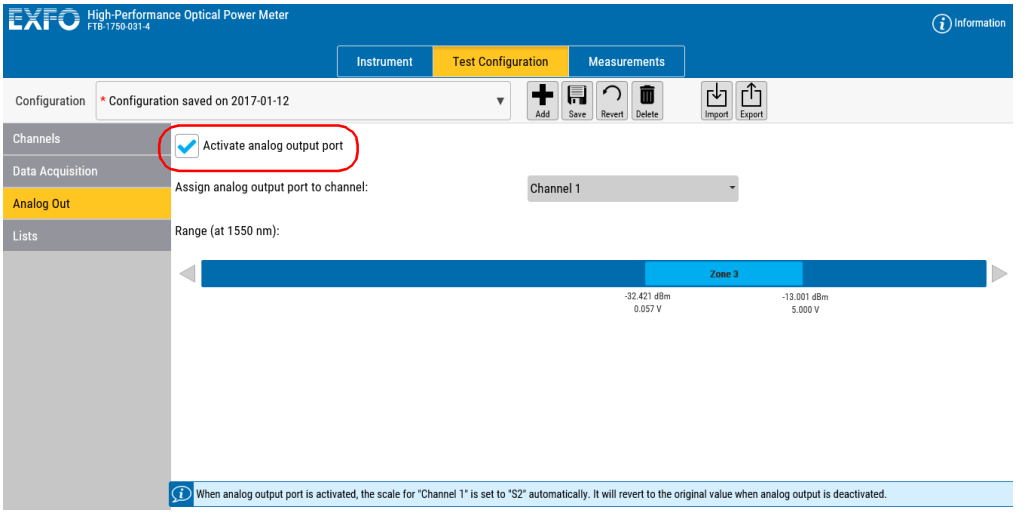


To set the analog output properties:

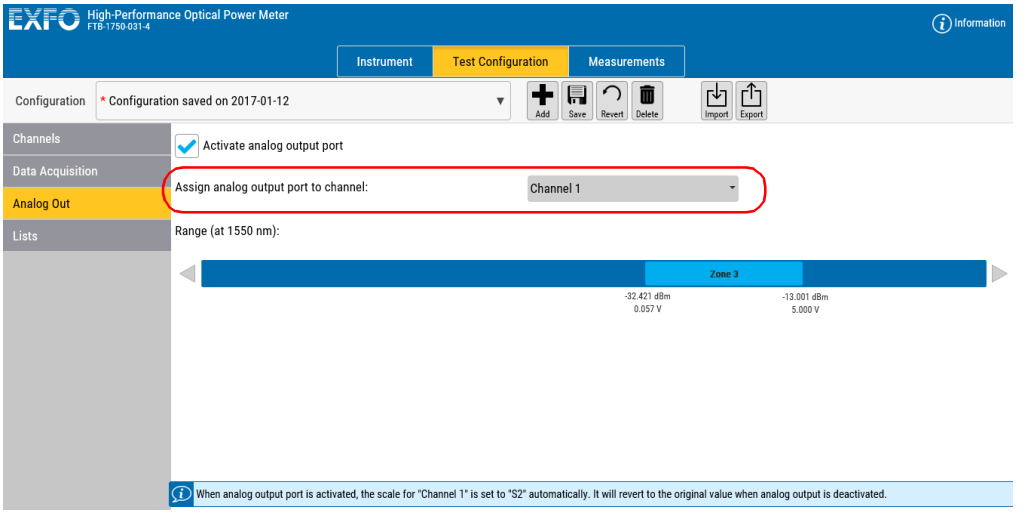
1. From the main window, click **Test Configuration**.
2. Select the **Analog Out** tab.



3. Enable the analog mode by selecting the corresponding option.



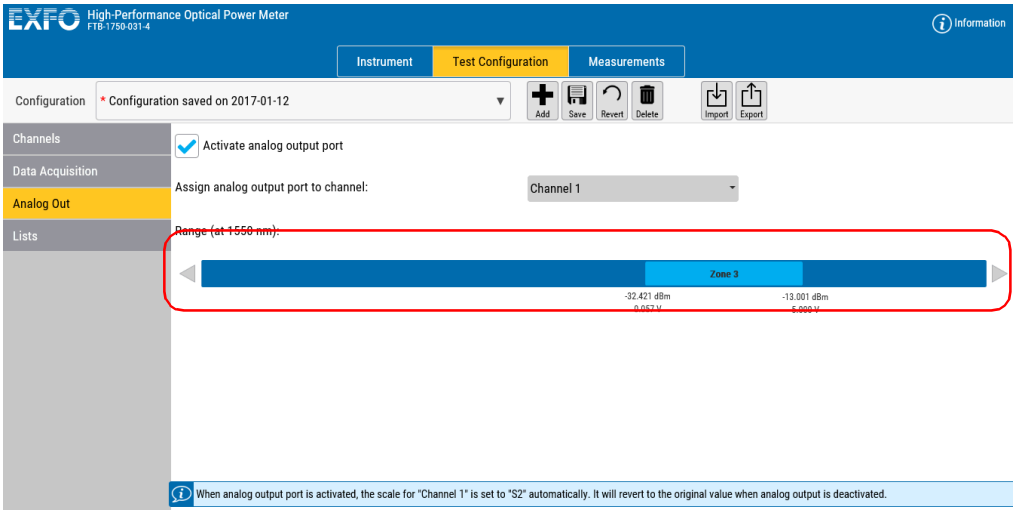
4. In the case of a multichannel power meter, select the source channel you want to associate with the analog output in the list.



5. Use the arrow buttons on each side of the slider to set the range for the analog output. The 0-5 Volt output range (the lighter section) will move accordingly along the available power range.

Note: *As you move the range, the **Max power** value is automatically updated.*

Note: *The power values indicated on the range are obtained using 1550 nm as the selected wavelength. The actual value may change depending on the wavelength you have selected.*



8 Recording Power Signal Variations

The Min./Max. function allows you to record the extremes of a varying power signal when performing a continuous acquisition. For example, it could be used to determine the stability of a light source over time or to measure the polarization-dependent loss (PDL) of a passive component when combined with a polarization state controller.

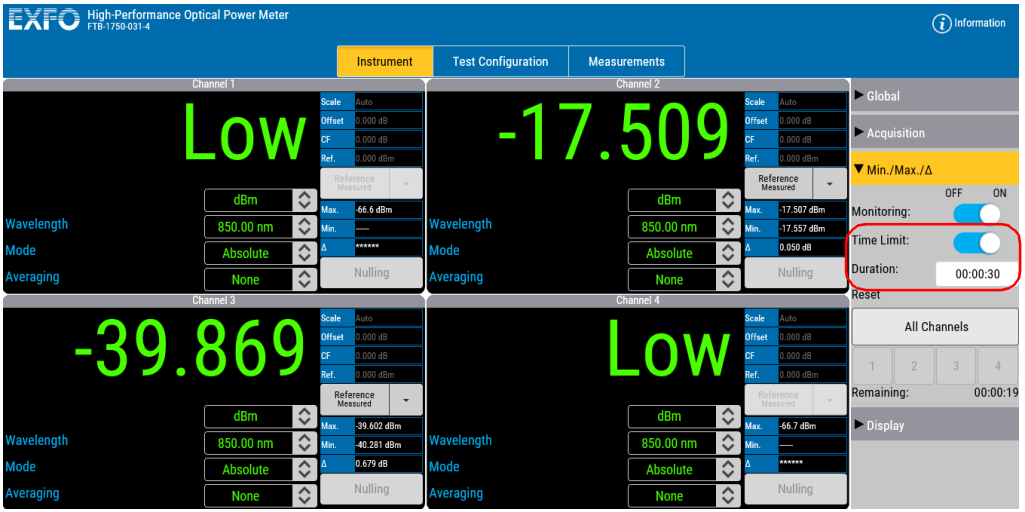
The function is started manually and can be stopped manually or automatically using the timer function. Minimum (Min.) and maximum (Max.) values can be recorded and displayed in any measurement unit (dB, dBm, W, or W/W; see *Selecting the Measurement Unit* on page 17). In logarithmic scales (dB and dBm), the difference between the maximum and minimum values is expressed as Max.–Min. In linear scales (W and W/W), the difference is expressed as a ratio (Min./Max.).

To use the Min./Max. function:

1. From the **Instrument** function tab, select the **Min./Max./Δ** tab.

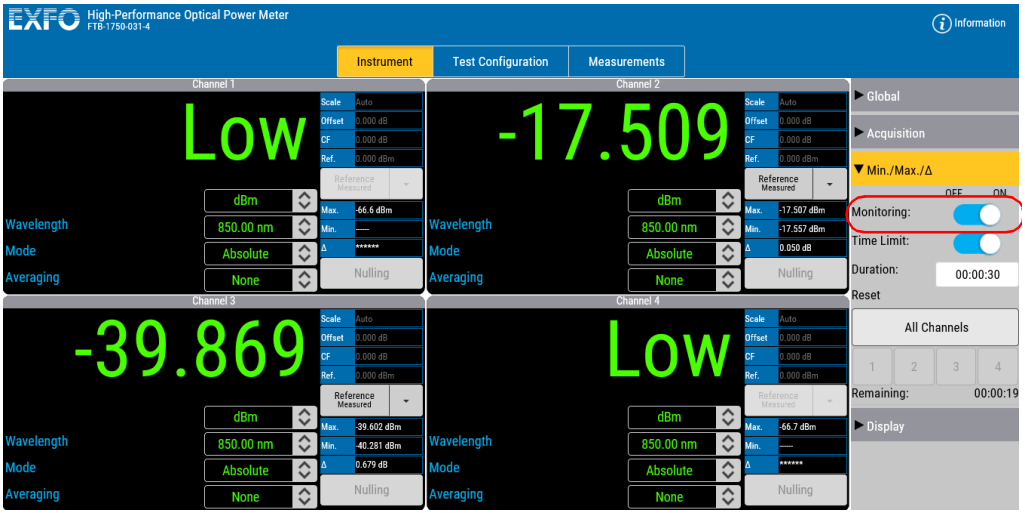
Note: *On multichannel modules, all channels are affected, whether they are displayed on screen or not.*

2. If you want to specify the duration of power measurements, set the **Time Limit** button to the **ON** position, then enter a span in the corresponding box.



3. Slide the **Monitoring** button to the **ON** position to start power measurements.

   These can be stopped at any time by sliding the button to the **OFF** position. If the timer is set, power measurements will stop automatically after the specified duration.



Note: *The remaining duration is indicated at the bottom of the **Min./Max.**/Δ tab.*

The **Reset** button will reinitialize the **Min./Max.**/Δ acquisition results in the data display. If you have more than one channel, you can click the corresponding channel number to reset only that one.

The results are continuously updated in the matching channel views. When a logarithmic scale is used, the Max.-Min. calculation is made to continuously provide the difference between the two extremes. In a linear scale, the Min./Max. ratio is computed to provide valuable information.

- If the power reaches the saturation level, +++++++ will be recorded as the Max. value. The Max.-Min. or Min./Max. calculation will also be +++++++.
- If the detected power decreases below the lowest measurable power, the Min. value will be −−−−−−− and both Max.-Min. or Min./Max. will display −−−−−−−.
- If a Min./Max. calculation is made with a null Min. value, ******* will be displayed.

9 Maintenance

To help ensure long, trouble-free operation:

- Always inspect fiber-optic connectors before using them and clean them if necessary.
- Keep the unit free of dust.
- Clean the unit casing and front panel with a cloth slightly dampened with water.
- Store unit at room temperature in a clean and dry area. Keep the unit out of direct sunlight.
- Avoid high humidity or significant temperature fluctuations.
- Avoid unnecessary shocks and vibrations.
- If any liquids are spilled on or into the unit, turn off the power immediately, disconnect from any external power source, remove the batteries and let the unit dry completely.

WARNING

The use of controls, adjustments and procedures, namely for operation and maintenance, other than those specified herein may result in hazardous radiation exposure or impair the protection provided by this unit.

Cleaning Detector Ports

Regular cleaning of detectors will help maintain measurement accuracy.

IMPORTANT

Always cover detectors with protective caps when unit is not in use.

To clean detector ports:

1. Remove the protective cap and adapter (FOA) from the detector.
2. If the detector is dusty, blow dry with compressed air.
3. Being careful not to touch the soft end of the swab, moisten a cleaning tip with *only one drop* of optical-grade liquid cleaner.

IMPORTANT

Some cleaners may leave traces if used abundantly. Do not use bottles that distribute too much liquid at a time.

4. While applying light pressure (to avoid breaking the detector window), gently rotate the cleaning tip on the detector window.
5. Repeat step 4 with a dry cleaning tip or blow dry with compressed air.
6. Discard the cleaning tips after one use.

Recalibrating the Unit

EXFO manufacturing and service center calibrations are based on the ISO/IEC 17025 standard (*General Requirements for the Competence of Testing and Calibration Laboratories*). This standard states that calibration documents must not contain a calibration interval and that the user is responsible for determining the re-calibration date according to the actual use of the instrument.

The validity of specifications depends on operating conditions. For example, the calibration validity period can be longer or shorter depending on the intensity of use, environmental conditions and unit maintenance, as well as the specific requirements for your application. All of these elements must be taken into consideration when determining the appropriate calibration interval of this particular EXFO unit.

Under normal use, the recommended interval for your High-Performance Power Meter is: one year.

For newly delivered units, EXFO has determined that the storage of this product for up to three months between calibration and shipment does not affect its performance.

To help you with calibration follow-up, EXFO provides a special calibration label that complies with the ISO/IEC 17025 standard and indicates the unit calibration date and provides space to indicate the due date. Unless you have already established a specific calibration interval based on your own empirical data and requirements, EXFO would recommend that the next calibration date be established according to the following equation:

Next calibration date = Shipping date+ Recommended calibration period (one year)

To ensure that your unit conforms to the published specifications, calibration may be carried out at an EXFO service center or, depending on the product, at one of EXFO's certified service centers. Calibrations at EXFO are performed using standards traceable to national metrology institutes.

Note: *You may have purchased a FlexCare plan that covers calibrations. See the Service and Repairs section of this user documentation for more information on how to contact the service centers and to see if your plan qualifies.*

Recycling and Disposal

This symbol on the product means that you should recycle or dispose of your product (including electric and electronic accessories) properly, in accordance with local regulations. Do not dispose of it in ordinary garbage receptacles.

For complete recycling/disposal information, visit the EXFO Web site at www.exfo.com/recycle.

10 Troubleshooting

Solving Common Problems

Here are a few suggestions for resolving common problems with your unit.

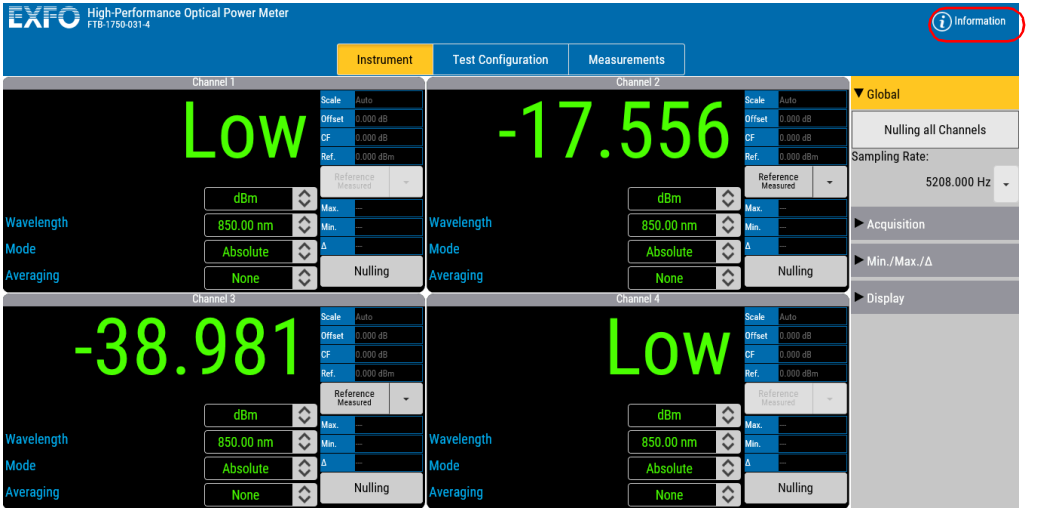
Problem	Probable Cause	Recommended Action
Questionable readings displayed.	The detector or optical connectors are dirty.	Clean the detector and all optical connections.
	The wavelength selection is improper.	Switch to the correct wavelength on all instruments being used.
	The offset nulling is incorrect.	Perform an offset nulling with protective cap installed.
	The optical source is unstable.	Wait for source to stabilize (at least 60 minutes).
	The correction factor is incorrect.	Reset the correction factor to 0.000 dB or 1.000 W/W.

Viewing Online Documentation

A PDF version of the user guide is available at all times for your High-Performance Power Meter.

To view the user guide:

1. From the main window, click **Information**.



2. Select **User Guide**.

Contacting the Technical Support Group

To obtain after-sales service or technical support for this product, contact EXFO at one of the following numbers. The Technical Support Group is available to take your calls from Monday to Friday, 8:00 a.m. to 7:00 p.m. (Eastern Time in North America).

Technical Support Group
400 Godin Avenue
Quebec (Quebec) G1M 2K2
CANADA

1 866 683-0155 (USA and Canada)
Tel.: 1 418 683-5498
Fax: 1 418 683-9224
support@exfo.com

For detailed information about technical support, and for a list of other worldwide locations, visit the EXFO Web site at www.exfo.com.

If you have comments or suggestions about this user documentation, you can send them to customer.feedback.manual@exfo.com.

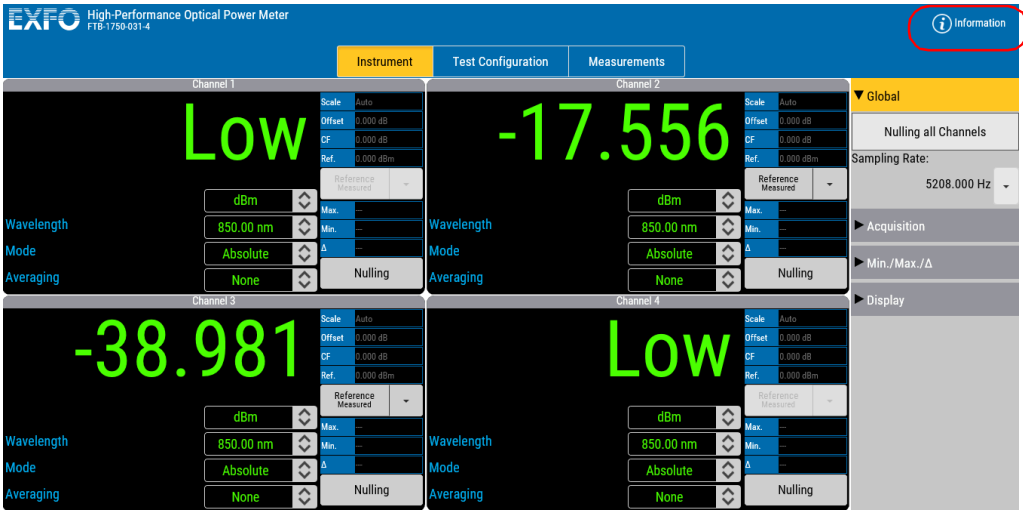
To accelerate the process, please have information such as the name and the serial number (see the product identification label), as well as a description of your problem, close at hand.

Viewing Product Information

You can see information about your product, such as the serial and version numbers and contact information at all times.

To view product information:

1. From the main window, click **Information**.



2. Once you are done, click anywhere on the screen to close the window.

Transportation

Maintain a temperature range within specifications when transporting the unit. Transportation damage can occur from improper handling. The following steps are recommended to minimize the possibility of damage:

- Pack the unit in its original packing material when shipping.
- Avoid high humidity or large temperature fluctuations.
- Keep the unit out of direct sunlight.
- Avoid unnecessary shocks and vibrations.

11 Warranty

General Information

EXFO Inc. (EXFO) warrants this equipment against defects in material and workmanship for a period of two years from the date of original shipment. EXFO also warrants that this equipment will meet applicable specifications under normal use.

During the warranty period, EXFO will, at its discretion, repair, replace, or issue credit for any defective product, as well as verify and adjust the product free of charge should the equipment need to be repaired or if the original calibration is erroneous. If the equipment is sent back for verification of calibration during the warranty period and found to meet all published specifications, EXFO will charge standard calibration fees.

IMPORTANT

The warranty can become null and void if:

- **unit has been tampered with, repaired, or worked upon by unauthorized individuals or non-EXFO personnel.**
- **warranty sticker has been removed.**
- **case screws, other than those specified in this guide, have been removed.**
- **case has been opened, other than as explained in this guide.**
- **unit serial number has been altered, erased, or removed.**
- **unit has been misused, neglected, or damaged by accident.**

THIS WARRANTY IS IN LIEU OF ALL OTHER WARRANTIES EXPRESSED, IMPLIED, OR STATUTORY, INCLUDING, BUT NOT LIMITED TO, THE IMPLIED WARRANTIES OF MERCHANTABILITY AND FITNESS FOR A PARTICULAR PURPOSE. IN NO EVENT SHALL EXFO BE LIABLE FOR SPECIAL, INCIDENTAL, OR CONSEQUENTIAL DAMAGES.

Gray Market and Gray Market Products

Gray market is a market where products are traded through distribution channels that are legal but remain unofficial, unauthorized, or unintended by the original manufacturer. Intermediaries using such channels to distribute products are considered to be part of the gray market (hereafter unauthorized intermediary).

EXFO considers that a product originates from the gray market (hereafter gray market product) in the following situations:

- A product is sold by an unauthorized intermediary.
- A product is designed and destined for a particular market and sold on a second market.
- A product is resold, despite being reported lost or stolen.

When products are purchased on the gray market, rather than through an authorized EXFO distribution channel, EXFO is unable to guarantee the source and quality of those products nor the local safety regulations and certifications (CE, UL, etc.).

EXFO will not honor warranty, install, maintain, repair, calibrate, provide technical support nor make any support contracts available for gray market products.

For complete information, refer to EXFO's policy regarding gray market products at www.exfo.com/en/how-to-buy/sales-terms-conditions/gray-market/

Liability

EXFO shall not be liable for damages resulting from the use of the product, nor shall be responsible for any failure in the performance of other items to which the product is connected or the operation of any system of which the product may be a part.

EXFO shall not be liable for damages resulting from improper usage or unauthorized modification of the product, its accompanying accessories and software.

Exclusions

EXFO reserves the right to make changes in the design or construction of any of its products at any time without incurring obligation to make any changes whatsoever on units purchased. Accessories, including but not limited to fuses, pilot lamps, batteries and universal interfaces (EUI) used with EXFO products are not covered by this warranty.

This warranty excludes failure resulting from: improper use or installation, normal wear and tear, accident, abuse, neglect, fire, water, lightning or other acts of nature, causes external to the product or other factors beyond the control of EXFO.

IMPORTANT

In the case of products equipped with optical connectors, EXFO will charge a fee for replacing connectors that were damaged due to misuse or bad cleaning.

Certification

EXFO certifies that this equipment met its published specifications at the time of shipment from the factory.

Service and Repairs

EXFO commits to providing product service and repair for five years following the date of purchase.

To send any equipment for service or repair:

1. Call one of EXFO's authorized service centers (see *EXFO Service Centers Worldwide* on page 90). Support personnel will determine if the equipment requires service, repair, or calibration.
2. If equipment must be returned to EXFO or an authorized service center, support personnel will issue a Return Merchandise Authorization (RMA) number and provide an address for return.
3. If possible, back up your data before sending the unit for repair.
4. Pack the equipment in its original shipping material. Be sure to include a statement or report fully detailing the defect and the conditions under which it was observed.
5. Return the equipment, prepaid, to the address given to you by support personnel. Be sure to write the RMA number on the shipping slip. *EXFO will refuse and return any package that does not bear an RMA number.*

Note: *A test setup fee will apply to any returned unit that, after test, is found to meet the applicable specifications.*

After repair, the equipment will be returned with a repair report. If the equipment is not under warranty, you will be invoiced for the cost appearing on this report. EXFO will pay return-to-customer shipping costs for equipment under warranty. Shipping insurance is at your expense.

Routine recalibration is not included in any of the warranty plans. Since calibrations/verifications are not covered by the basic or extended warranties, you may elect to purchase FlexCare Calibration/Verification Packages for a definite period of time. Contact an authorized service center (see *EXFO Service Centers Worldwide* on page 90).

EXFO Service Centers Worldwide

If your product requires servicing, contact your nearest authorized service center.

EXFO Headquarters Service Center
400 Godin Avenue
Quebec (Quebec) G1M 2K2
CANADA

1 866 683-0155 (USA and Canada)
Tel.: 1 418 683-5498
Fax: 1 418 683-9224
support@exfo.com

EXFO Europe Service Center
Winchester House, School Lane
Chandlers Ford, Hampshire S053 4DG
ENGLAND

Tel.: +44 2380 246800
Fax: +44 2380 246801
support.europe@exfo.com

EXFO Telecom Equipment (Shenzhen) Ltd.
3rd Floor, Building C,
FuNing Hi-Tech Industrial Park, No. 71-3,
Xintian Avenue,
Fuhai, Bao'An District,
Shenzhen, China, 518103

Tel: +86 (755) 2955 3100
Fax: +86 (755) 2955 3101
support.asia@exfo.com

To view EXFO's network of partner-operated Certified Service Centers nearest you, please consult EXFO's corporate website for the complete list of service partners:
http://www.exfo.com/support/services/instrument-services/exfo-service-centers.

A SCPI Command Reference

This appendix presents detailed information on the commands and queries supplied with your High-Performance Power Meter.

IMPORTANT

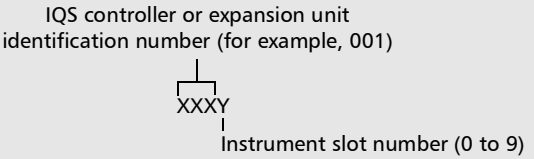
Since the platforms can house many instruments, you must explicitly specify which instrument you want to remotely control.

You must add the following mnemonic *at the beginning of any command or query* that you send to an instrument:

LINStrument<LogicalInstrumentPos>:

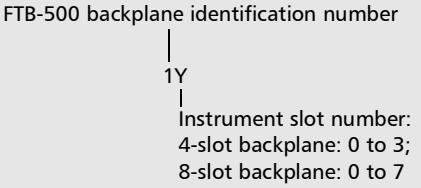
where <*LogicalInstrumentPos*> corresponds to the identification number of the instrument.

➤ **For instruments usable with IQS-600 platforms:**



For information on modifying unit identification, refer to your platform user guide.

➤ **For instruments usable with FTB-500 platforms:**



➤ **For instruments usable with other platforms:**

Use the LINS value defined in the Remote Control Configuration tool (accessible from System Settings). For information on modifying the LINS value, refer to your platform user guide.

Quick Reference Command Tree

Command						Parameter(s)
ABORt						
FETCh[1..n]	[SCALar]	POWer	DC?			
FORMat[1..n]	[DATA]					<FormatData>
	[DATA]?					
INITiate	AUTO					<StartStop>,CONT|NCONt
	AUTO?					
	EXTRema					<Extrema>
	EXTRema?					
	[IMMediate]					
LOCK	[STATe]					<State>
	[STATe]?					
MEASure[1..n]	[SCALar]	POWer	MAXimum?			
			MINimum?			
MMEMory	ACQuisition					<StartStop>,CONT|NCONt
	ACQuisition?					
	ACQuisition	DURation				<TimeHour>,<TimeMinute>,<TimeSecond>
		DURation?				
		DURation	MMAXimum			<TimeSecond>
			MMAXimum?			
			MMAXimum	STATe		<StateDurMinMax>
				STATe?		

Command						Parameter(s)
	FNAMe					<FileName>
	FNAMe?					
OUTPut	ANALog	COUNt?				
		STATe				<AnalogOutputState>
		STATe?				
		ROUTe				<Channel>
		ROUTe?				
		RANGe				<Power[<wsp>W|DBM]>
			[UPPer]?			
			LOWer?			
		VOLTage	[MAXimum]?			
READ[1..n]	[SCALar]	POWer	DC?			
RST						
SENSe[1..n]	AVERage	[STATe]				<AverageState>
		[STATe]?				
		COUNt				<AverageCount>|MAXimum|MINimum|DEFault
		COUNt?				[MINimum|MAXimum|DEFault]
	CORRection	COLLect	ZERO			
				ALL		
		FACTor	[MAGNitude]			<CorrectionFactor[<wsp>W/W|DB]>|MAXimum|MINimum|DEFault
			[MAGNitude]?			[MINimum|MAXimum|DEFault]
		OFFSet	[MAGNitude]			<CorrectionOffset[<wsp>W/W|DB]>|MAXimum|MINimum|DEFault

Command						Parameter(s)
			[MAGNitude]?			[MINimum|MAXimum|DEFault]
	FREQuency	CONTinuous				<ContinuousRate[<wsp>HZ]>
		CONTinuous?				
		CONTinuous	CATalog?			
		NCONtinuous				<SingleRate[<wsp>HZ]>
		NCONtinuous?				
		NCONtinuous	CATalog?			
	POWer	[DC]	RANGe	AUTO		<AutoRangeState>
				AUTO?		
				SCALe		<Scale>
				SCALe?		
				SCALe	LIST?	
			REFerence			<Reference[<wsp>W|DBM]>|MAXimum|MINimum|DEFault
			REFerence?			[MINimum|MAXimum|DEFault]
			REFerence	ALL		
				DISPlay		
				STATe		<ReferenceState>
				STATe?		
		WAVelength				<Wavelength>|MAXimum|MINimum|DEFault
		WAVelength?				[MINimum|MAXimum|DEFault]
SLINstrument	CATalog?					
	CATalog	FULL?				

Command						Parameter(s)
SNUMber?						
STATus?						
STATus	OPERation	BIT[1..n]	CONDition?			
TRACe[1..n]	[DATA]?					TRC1|TRC2|TRC3|TRC4
	MAX?					TRC1|TRC2|TRC3|TRC4
	MIN?					TRC1|TRC2|TRC3|TRC4
	POINts					TRC1|TRC2|TRC3|TRC4[,<Number Point>]
	POINts?					TRC1|TRC2|TRC3|TRC4
TRIGger	POSition					<TriggerPosition>
	POSition?					
	POSition	CATalog?				
	[SEQuence]	LEVel				<TriggerPowerLevel>
		LEVel?				
		SLOPe				NEGative|POSitive
		SLOPe?				
		SOURce				EXTernal|INTernal1|INTernal2|INTernal3|INTernal4|INTernal5|INTernal6
		SOURce?				
		STATe				<TriggerState>
		STATe?				
UNIT[1..n]	POWer					DB|DBM|W|W/W|WATT|WATT/WATT
	POWer?					

Product-Specific Commands—Description

:ABORt	
Description	This command is used to stop the acquisition currently in progress.
Syntax	:ABORt
Parameter(s)	None
Example(s)	INIT:AUTO 1, CONT ABOR
See Also	INITiate:AUTO INITiate:AUTO? INITiate:EXTRema INITiate:EXTRema? MMEMory:ACQuisition MMEMory:ACQuisition?

:FETCh[1..n][:SCALar]:POWer:DC?

Description	This query returns the stored value on the specified channel. To fetch a specific channel, enter the channel number as a suffix of the FETC keyword. The maximum channel is device-dependent. Channel 1 is always used by default.
Syntax	:FETCh[1..n][:SCALar]:POWer:DC?
Parameter(s)	None
Response Syntax	<PowerMeasurement>
Response(s)	*PowerMeasurement:* The response data syntax for <PowerMeasurement> is defined as a <NR3 NUMERIC RESPONSE DATA> element. It is the stored value on the specified channel.
Example(s)	READ:POW:DC? FETC1:POW:DC?
See Also	MEASure:SCALar:POWer:MAX? MEASure:SCALar:POWer:MIN? READ:SCALar:POWer:DC?

:FORMat[1..n][:DATA]

Description	This command changes the resolution of the power value when dB or dBm is selected for the specified channel.
Syntax	:FORMat[1..n][:DATA]<wsp><FormatData>
Parameter(s)	*FormatData:* The program data syntax for <FormatData> is defined as a <DECIMAL NUMERIC PROGRAM DATA> element. Changes the data format
Example(s)	FORM:DATA 3
See Also	FORMat[:DATA]?

:FORMat[1..n][:DATA]?

Description	This query returns the resolution of the power value when dB or dBm is selected for the specified channel.
Syntax	:FORMat[1..n][:DATA]?
Parameter(s)	None
Response Syntax	<FormatData>
Response(s)	*FormatData:* The response data syntax for <FormatData> is defined as a <NR3 NUMERIC RESPONSE DATA> element. This query returns the data format.
Example(s)	FORM:DATA?
See Also	FORMat[:DATA]

:INITiate:AUTO

Description

This command starts or stops an acquisition using the number of points set with the TRAC:POIN command and the sampling rate set with the SENS:FREQ[:CONT] or SENS:FREQ:NCON commands.

Syntax

:INITiate:AUTO<wsp><StartStop>,CONT|NCONt

Parameter(s)

➤ *StartStop:*

The program data syntax for <StartStop> is defined as a <Boolean Program Data> element. The <StartStop> special forms ON and OFF are accepted on input for increased readability. ON corresponds to 1 and OFF corresponds to 0.

This parameter changes the state of an acquisition:
0 or OFF - Stops the acquisition.
1 or ON - Starts the acquisition.

➤ *AcqType:*

The program data syntax for the second parameter is defined as a <CHARACTER PROGRAM DATA> element. The allowed <CHARACTER PROGRAM DATA> elements for this parameter are: CONT|NCONt.

:INITiate:AUTO

	This parameter allows to set the acquisition mode: CONT sets Continuous acquisition. NCON sets Single acquisition.
Example(s)	TRAC:POIN TRC1, 5 INIT:AUTO 1, CONT INIT:AUTO 0, CONT or INIT:AUTO 1, NCON
See Also	ABORt INITiate:AUTO? INITiate:EXTRema MMEMory:ACQuisition TRACe:POINt

:INITiate:AUTO?

Description	This query returns a value indicating whether a programmed (or "Autostop") acquisition is in progress.
Syntax	:INITiate:AUTO?
Parameter(s)	None
Response Syntax	<AcqOnOff>
Response(s)	*AcqOnOff:* The response data syntax for <AcqOnOff> is defined as a <NR1 NUMERIC RESPONSE DATA> element. This query returns the current <AcqOnOff> acquisition state: 0 - Autostop acquisition is stopped. 1 - Autostop acquisition is running.
Example(s)	INIT:AUTO?
See Also	ABORt INITiate:AUTO INITiate:EXTRema INITiate:EXTRema? MMEMory:ACQuisition MMEMory:ACQuisition? TRACe:POINt

:INITiate:EXTRema

Description	This command starts or stops the Min./Max. power measurements in Continuous acquisition mode for all channels.
Syntax	:INITiate:EXTRema<wsp><Extrema>
Parameter(s)	*Extrema:* The program data syntax for <Extrema> is defined as a <Boolean Program Data> element. The <Extrema> special forms ON and OFF are accepted on input for increased readability. ON corresponds to 1 and OFF corresponds to 0. This parameter allows to change the Min./Max. measurement status: 0 - Stops the Min./Max. measurements. 1 - Starts the Min./Max. measurements.
Example(s)	INIT:EXTR ON
See Also	ABORt INITiate:AUTO INITiate:AUTO? INITiate:EXTRema? MMEMory:ACQuisition MMEMory:ACQuisition? TRACe:POINt

:INITiate:EXTRema?

Description	This query returns a value indicating whether Min./Max. power measurements are in progress in Continuous acquisition mode.
Syntax	:INITiate:EXTRema?
Parameter(s)	None
Response Syntax	<ExtremaOnOFF>
Response(s)	*ExtremaOnOFF:* The response data syntax for <ExtremaOnOFF> is defined as a <NR1 NUMERIC RESPONSE DATA> element. This query returns the current Min./Max. measurements status: 0 - Min./Max. measurements have stopped. 1 - Min./Max. measurements are in progress.
Example(s)	INIT:EXTR?
See Also	ABORt INITiate:AUTO INITiate:AUTO? INITiate:EXTRema MMEMory:ACQuisition MMEMory:ACQuisition? TRACe:POINt

:INITiate[:IMMediate]

Description	This command stores one value in the buffer for all channels.
Syntax	:INITiate[:IMMediate]
Parameter(s)	None
Example(s)	INIT:IMM FETC1:POW:DC? or INIT FETC1:POW:DC?
See Also	FETCh[:SCAL]:POWer:DC? READ[:SCAL]:POWer:DC? ABORt INITiate:AUTO INITiate:CONTinuous INITiate:EXTRema MMEMory:ACQuisition

:LOCK[:STATe]

Description	The :LOCK:STATe command controls the API write lock. When locked, only SCPI can change the instrument configuration.
Syntax	:LOCK[:STATe]<wsp><State>
Parameter(s)	*State:* The program data syntax for <State> is defined as a <Boolean Program Data> element. The <State> special forms ON and OFF are accepted on input for increased readability. ON corresponds to 1 and OFF corresponds to 0. The <State> is rounded to an integer. A non-zero result is interpreted as 1.
Example(s)	:LOCK:STAT ON (api is locked) :LOCK:STAT 0 (api is unlocked)
See Also	:LOCK:STATe?

:LOCK[:STATe]?

Description	The :LOCK:STATe? command return the locked state of the instrument API.
Syntax	:LOCK[:STATe]?
Parameter(s)	None
Response Syntax	<State>
Response(s)	*State:* The response data syntax for <State> is defined as a <NR1 NUMERIC RESPONSE DATA> element. 1 corresponds to ON and 0 corresponds to OFF.
Example(s)	:LOCK:STAT? returns 1 (api locked) :LOCK:STAT? returns 0 (api unlocked)
See Also	:LOCK:STATe

:MEASure[1..n][:SCALar]:POWer:MAXimum?

Description	This query returns the maximum power measurement value recorded for a channel in Continuous acquisition mode.
Syntax	:MEASure[1..n][:SCALar]:POWer:MAXimum?
Parameter(s)	None
Response Syntax	<MaxPower>
Response(s)	*MaxPower:* The response data syntax for <MaxPower> is defined as a <NR3 NUMERIC RESPONSE DATA> element. This query returns the power measurement maximum for a channel in the currently selected unit. The number of digits after the decimal depends on the selected resolution. To change the resolution of the displayed power value in dB or dBm, use the FORM[:DATA] command. To know the current measurement unit, use the UNIT:POWer? query.
Example(s)	INIT:EXTR ON MEAS:POW:MAX?
See Also	INITiate:EXTRema MEASure:SCALare:POWer:MIN?

:MEASure[1..n][:SCALar]:POWer:MINimum?

Description	This query returns the minimum power measurement value recorded for a channel in Continuous acquisition mode.
Syntax	:MEASure[1..n][:SCALar]:POWer:MINimum?
Parameter(s)	None
Response Syntax	<MinPower>
Response(s)	*MinPower:* The response data syntax for <MinPower> is defined as a <NR3 NUMERIC RESPONSE DATA> element. This query returns the power measurement minimum in the currently selected unit. The number of digits after the decimal depends on the selected resolution. To change the resolution of the displayed power value in dB or dBm, use the FORM[:DATA] command. To know the current measurement unit, use the UNIT:POWer? query.
Example(s)	INIT:EXTR ON MEAS:POW:MIN?
See Also	INITiate:EXTRema MEASure:SCALare:POWer:MAX?

:MMEMory:ACQuisition

Description

This command initiates a data acquisition and acquires data at the selected sampling rate. The acquisition will be saved to the system hard drive in the file specified with the MMEM:FNAM command.
The acquisition will continue for the duration specified in the MMEM:ACQ:DUR command.

Syntax

:MMEMory:ACQuisition<wsp><StartStop>,CONT|NCONt

Parameter(s)

➤ *StartStop:*

The program data syntax for <StartStop> is defined as a <Boolean Program Data> element. The <StartStop> special forms ON and OFF are accepted on input for increased readability. ON corresponds to 1 and OFF corresponds to 0.

This parameter allows to change the state of an acquisition:
0 or OFF - Stops the acquisition.
1 or ON - Starts the acquisition.

➤ *AcqType:*

The program data syntax for the second parameter is defined as a <CHARACTER PROGRAM DATA> element. The allowed <CHARACTER PROGRAM DATA> elements for this parameter are: CONT|NCONt.

:MMEMory:ACQuisition

	The acquisition state can be modified with: CONT - sets the Continuous acquisition rate. NCON - sets the Single acquisition rate.
Example(s)	MMEM:ACQ 1, CONT MMEM:ACQ? MMEM:ACQ 0, CONT or MMEM:ACQ 1, NCON MMEM:ACQ 0, NCON
See Also	MMEMory:FNAMe MMEMory:ACQuisition? MMEMory:ACQuisition:DURation MMEMory:ACQuisition:DURation? ABORt INITiate:AUTO? INITiate:EXTRema

:MMEMory:ACQuisition?

Description	This query returns the acquisition flag. 0 - No memory acquisition running. 1 - Memory acquisition running.
Syntax	:MMEMory:ACQuisition?
Parameter(s)	None
Response Syntax	<AcqOnOff>
Response(s)	*AcqOnOff:* The response data syntax for <AcqOnOff> is defined as a <NR1 NUMERIC RESPONSE DATA> element. This query returns the current memory acquisition state: 0 - Memory acquisition is off. 1 - Memory acquisition is on.
Example(s)	MMEM:ACQ 1, CONT MMEM:ACQ? MMEM:ACQ 0, CONT MMEM:ACQ?
See Also	MMEMory:ACQuisition MMEMory:ACQuisition:DURation MMEMory:ACQuisition:DURation? ABORt INITiate:AUTO? INITiate:EXTRema

:MMEMory:ACQuisition:DURation

Description

This command is used to set the duration of an acquisition.

Syntax

:MMEMory:ACQuisition:DURation<wsp><TimeHour>,<TimeMinute>,<TimeSecond>

Parameter(s)

➤ *TimeHour:*

The program data syntax for <TimeHour> is defined as a <DECIMAL NUMERIC PROGRAM DATA> element.

Used to set the duration of the acquisition in hours.

➤ *TimeMinute:*

The program data syntax for <TimeMinute> is defined as a <DECIMAL NUMERIC PROGRAM DATA> element.

Used to set the duration of acquisition in minutes.

➤ *TimeSecond:*

The program data syntax for <TimeSecond> is defined as a <DECIMAL NUMERIC PROGRAM DATA> element.

Used to set the duration of acquisition in seconds.

:MMEMory:ACQuisition:DURation

Example(s)	MMEM:ACQ:DUR 1,1,1
Notes	This command interacts with the TRAC:POIN and SENS:FREQ commands. For a given SENS:FREQ, this command will influence the number of points. In normal operation, either the TRAC:POIN or this command would be used.
See Also	MMEMory:ACQuisition:DURation? MMEMory:ACQuisition MMEMory:ACQuisition:DURation:MMAXimum INITiate:AUTO INITiate:EXTRema TRACe:POINts

:MMEMory:ACQuisition:DURation?

Description	This query returns the duration of the acquisition.
Syntax	:MMEMory:ACQuisition:DURation?
Parameter(s)	None
Response Syntax	<AcqTime>
Response(s)	*AcqTime:* The response data syntax for <AcqTime> is defined as a <DEFINITE LENGTH ARBITRARY BLOCK RESPONSE DATA> element. This query returns the duration for the acquisition in hour, minute, second format.
Example(s)	MMEM:ACQ:DUR?
See Also	MMEMory:ACQuisition:DURation MMEMory:ACQuisition MMEMory:ACQuisition:DURation:MMAXimum INITiate:AUTO INITiate:EXTRema

:MMEMory:ACQuisition:DURation:MMAXimum

Description	This command is used to set the duration of the Min./Max. acquisition.
Syntax	:MMEMory:ACQuisition:DURation:MMAXimum<wsp><TimeSecond>
Parameter(s)	*TimeSecond:* The program data syntax for <TimeSecond> is defined as a <DECIMAL NUMERIC PROGRAM DATA> element. Changes the Min./Max. acquisition duration in seconds.
Example(s)	MMEM:ACQ:DUR:MMAX 120
See Also	MMEMory:ACQuisition:DURation:MMAXimum? MMEMory:ACQuisition:DURation:MMAXimum:STATe MMEMory:ACQuisition:DURation MMEMory:ACQuisition INITiate:AUTO INITiate:EXTRema

:MMEMory:ACQuisition:DURation:MMAXimum?

Description	This query returns the duration of the Min./Max. acquisition.
Syntax	:MMEMory:ACQuisition:DURation:MMAXimum?
Parameter(s)	None
Response Syntax	<AcqMinMaxTime>
Response(s)	*AcqMinMaxTime:* The response data syntax for <AcqMinMaxTime> is defined as a <NR1 NUMERIC RESPONSE DATA> element. This query returns the Min./Max. acquisition duration in seconds.
Example(s)	MMEM:ACQ:DUR:MMAX?
See Also	MMEMory:ACQuisition:DURation:MMAXimum MMEMory:ACQuisition:DURation:MMAXimum:STATe MMEMory:ACQuisition:DURation MMEMory:ACQuisition INITiate:AUTO INITiate:CONTinuous INITiate:EXTRema

:MMEMory:ACQuisition:DURation:MMAXimum:STATe

Description	This command is used to set the timer state of the Min. Max. acquisition.
Syntax	:MMEMory:ACQuisition:DURation:MMAXimum:STATe<wsp><StateDurMinMax>
Parameter(s)	*StateDurMinMax:* The program data syntax for <StateDurMinMax> is defined as a <Boolean Program Data> element. The <StateDurMinMax> special forms ON and OFF are accepted on input for increased readability. ON corresponds to 1 and OFF corresponds to 0. Changes the timer state for the Min./Max. acquisition. 0 -Timer for the Min. Max. acquisition is disabled. 1 -Timer for the Min. Max. acquisition is enabled.
Example(s)	MMEM:ACQ:DUR:MMAX:STAT ON
See Also	MMEMory:ACQuisition:DURation:MMAXimum MMEMory:ACQuisition:DURation:MMAXimum:STATe? MMEMory:ACQuisition:DURation MMEMory:ACQuisition INITiate:AUTO INITiate:EXTRema

:MMEMory:ACQuisition:DURation:MMAXimum:STATe?

Description	This query returns the timer state of acquisition, namely if the duration function of acquisition Min. Max. is active or not.
Syntax	:MMEMory:ACQuisition:DURation:MMAXimum:STATe?
Parameter(s)	None
Response Syntax	<AcqMinMaxState>
Response(s)	*AcqMinMaxState:* The response data syntax for <AcqMinMaxState> is defined as a <NR1 NUMERIC RESPONSE DATA> element. This query returns the timer state of Min./Max. acquisition. 0 -Timer is disabled 1 -Timer is enabled
Example(s)	MMEM:ACQ:DUR:MMAX:STAT?
See Also	MMEMory:ACQuisition:DURation:MMAXimum MMEMory:ACQuisition:DURation:MMAXimum:STATe MMEMory:ACQuisition:DURation MMEMory:ACQuisition INITiate:AUTO INITiate:EXTRema

:MMEMory:FNAMe	
Description	This command is used to set the acquisition name.
Syntax	:MMEMory:FNAMe<wsp><FileName>
Parameter(s)	*FileName:* The program data syntax for <FileName> is defined as a <STRING PROGRAM DATA> element. Changes the file name. Example: PmACQ
Example(s)	MMEM:FNAM PmACQ
See Also	MMEMory:FNAMe?

:MMEMory:FNAMe?

Description	This query returns the acquisition name.
Syntax	:MMEMory:FNAMe?
Parameter(s)	None
Response Syntax	<FileName>
Response(s)	*FileName:* The response data syntax for <FileName> is defined as a <STRING RESPONSE DATA> element. This query returns the files name. Response format: PmACQ
Example(s)	MMEM:FNAM?
See Also	MMEMory:NAMe

:OUTPut:ANALog:COUNt?

Description	Returns the number of analog outputs available on the module
Syntax	:OUTPut:ANALog:COUNt?
Parameter(s)	None
Response Syntax	<Count>
Response(s)	*Count:* The response data syntax for <Count> is defined as a <NR1 NUMERIC RESPONSE DATA> element.
Example(s)	OUTPut:ANALog:COUNt? Returns 0 or 1

:OUTPut:ANALog:STATe

Description	Enables/Disables the analog output.
Syntax	:OUTPut:ANALog:STATe<wsp><AnalogOutputState>
Parameter(s)	*AnalogOutputState:* The program data syntax for <AnalogOutputState> is defined as a <Boolean Program Data> element. The <AnalogOutputState> special forms ON and OFF are accepted on input for increased readability. ON corresponds to 1 and OFF corresponds to 0. The <AnalogOutputState> parameter is the desired state: 0 or OFF, deactivates the analog output. 1 or ON, activates the the analog output.
Example(s)	OUTPut:ANALog:STATe ON OUTPut:ANALog:STATe OFF

:OUTPut:ANALog:STATe?

Description	Returns the current state of a specified analog output.
Syntax	:OUTPut:ANALog:STATe?
Parameter(s)	None
Response Syntax	<AnalogOutputState>
Response(s)	*AnalogOutputState:* The response data syntax for <AnalogOutputState> is defined as a <NR1 NUMERIC RESPONSE DATA> element. Returns the current status of the analog output: 0 = OFF 1 = ON
Example(s)	OUTPut:ANALog:STATe ON OUTPut:ANALog:STATe? returns 1

:OUTPut:ANALog:ROUTe

Description	This command is used to specify the detector to which the analog output is assigned.
Syntax	:OUTPut:ANALog:ROUTe<wsp><Channel>
Parameter(s)	*Channel:* The program data syntax for <Channel> is defined as a <DECIMAL NUMERIC PROGRAM DATA> element. The <Channel> parameter represents the detetector to which the analog output is linked.
Example(s)	OUTPut:ANALog:ROUTe 1 OUTPut:ANALog:ROUTe 2

:OUTPut:ANALog:ROUTe?

Description	This command is used to retrieve the detector to which the analog output is assigned.
Syntax	:OUTPut:ANALog:ROUTe?
Parameter(s)	None
Response Syntax	<Channel>
Response(s)	*Channel:* The response data syntax for <Channel> is defined as a <NR1 NUMERIC RESPONSE DATA> element. The channel number to which the specified analog output is linked.
Example(s)	OUTPut:ANALog:ROUTe 1 OUTPut:ANALog:ROUTe 2 OUTPut:ANALog:ROUTe? returns 1 OUTPut:ANALog:ROUTe? returns 2

:OUTPut:ANALog:RANGe

Description	This command sets the highest optical power value associated to the upperbound range of the voltage window.
Syntax	:OUTPut:ANALog:RANGe<wsp><Power[<wsp>W|DBM]>
Parameter(s)	*Power:* The program data syntax for <Power> is defined as a <DECIMAL NUMERIC PROGRAM DATA> element followed by an optional <SUFFIX PROGRAM DATA> element. The allowed <SUFFIX PROGRAM DATA> elements are: W|DBM. The <Power> parameter represents the highest optical power that would be measured by the detector associated to the analog output.
Example(s)	OUTPut:ANALog:RANGe 10e-6

:OUTPut:ANALog:RANGe[:UPPer]?

Description	Gets the actual highest power value (Watt). Note: The upper value may not correspond to the value specified with the command OUTPut1:ANALog:RANGe.
Syntax	:OUTPut:ANALog:RANGe[:UPPer]?
Parameter(s)	None
Response Syntax	<UpperBound>
Response(s)	*UpperBound:* The response data syntax for <UpperBound> is defined as a <NR3 NUMERIC RESPONSE DATA> element. Returns the optical power associated to the upperbound voltage value.
Example(s)	OUTPut:ANALog:RANGe 10e-6 OUTPut:ANALog:RANGe:UPPer? returns 10e-6
Notes	The returned value may differ. In all cases it should be equal or greater to the specified value.

:OUTPut:ANALog:RANGe:LOWer?

Description	Gets the maximum power range associated to the current voltage window's position.
Syntax	:OUTPut:ANALog:RANGe:LOWer?
Parameter(s)	None
Response Syntax	<LowerBound>
Response(s)	*LowerBound:* The response data syntax for <LowerBound> is defined as a <NR3 NUMERIC RESPONSE DATA> element. Returns the optical power associated to the lowerbound voltage value.
Example(s)	OUTPut:ANALog:RANGe 10e-6 OUTPut:ANALog:RANGe:LOWer? returns 1e-9

:OUTPut:ANALog:VOLTage[:MAXimum]?

Description	Gets the maximum voltage value of the analog output
Syntax	:OUTPut:ANALog:VOLTage[:MAXimum]?
Parameter(s)	None
Response Syntax	<MaximumVoltage>
Response(s)	*MaximumVoltage:* The response data syntax for <MaximumVoltage> is defined as a <NR3 NUMERIC RESPONSE DATA> element. Returns the maximum voltage on the analog output.
Example(s)	OUTPut:ANALog:VOLTage:MAXimum? Returns 4.01

:READ[1..n][:SCALar]:POWer:DC?

Description	With this query, a measurement value is stored and returned. To read a specific channel, enter the channel number as a suffix of the READ keyword. The maximum channel is device-dependent. Channel 1 is always used by default.
Syntax	:READ[1..n][:SCALar]:POWer:DC?
Parameter(s)	None
Response Syntax	<PowerMeasurement>
Response(s)	*PowerMeasurement:* The response data syntax for <PowerMeasurement> is defined as a <NR3 NUMERIC RESPONSE DATA> element. This query returns the current power. If the returned value is: 9221120237577961472, power is under range 9221120238114832384, power is over range 9221120238651703296, power is invalid 9221120239188574208, channel is inactive

:READ[1..n][:SCALar]:POWer:DC?	
Example(s)	READ:SCAL:POW:DC? Returns -1.254000E+001 READ:SCAL:POW:DC? Returns 9221120237577961472 (UNDERRANGE) READ:SCAL:POW:DC? Returns 9221120238114832384 (OVERRANGE) READ:SCAL:POW:DC? Returns 9221120238651703296 (INVALID) READ:SCAL:POW:DC? Returns 9221120239188574208 (INACTIVE)
See Also	FETCh:SCALar:POWer:DC? MEASure:SCALar:POWer:MAX? MEASure:SCALar:POWer:MIN?

:RST	
Description	The command resets the power meter to its default configuration. Any acquisition in progress will also be aborted.
Syntax	:RST
Parameter(s)	None
Example(s)	RST

:SENSe[1..n]:AVERage[:STATe]

Description	This command turns the averaging ON or OFF
Syntax	:SENSe[1..n]:AVERage[:STATe]<wsp><Average State>
Parameter(s)	*AverageState:* The program data syntax for <AverageState> is defined as a <Boolean Program Data> element. The <AverageState> special forms ON and OFF are accepted on input for increased readability. ON corresponds to 1 and OFF corresponds to 0. State of averaging: 0 or OFF -Disables Averaging 1 or ON -Enables Averaging
Example(s)	SENS:AVER:STAT ON
See Also	SENSe:AVERage:STATe? SENSe:AVERage:COUNt SENSe:AVERage:COUNt?

:SENSe[1..n]:AVERage[:STATe]?

Description	This query returns the current averaging state.
Syntax	:SENSe[1..n]:AVERage[:STATe]?
Parameter(s)	None
Response Syntax	<AverageState>
Response(s)	*AverageState:* The response data syntax for <AverageState> is defined as a <NR1 NUMERIC RESPONSE DATA> element. State of averaging: 0 -Averaging is disabled. 1 -Averaging is enabled.
Example(s)	SENS:AVER:STAT?
See Also	SENSe:AVERage:STATe SENSe:AVERage:COUNt SENSe:AVERage:COUNt?

:SENSe[1..n]:AVERage:COUNt

Description	Sets the number of measurements used to calculate the final measurement's average on the specified channel.
Syntax	:SENSe[1..n]:AVERage:COUNt<wsp><AverageCount>|MAXimum|MINimum|DEFault
Parameter(s)	*AverageCount:* The program data syntax for <AverageCount> is defined as a <numeric_value> element. The <AverageCount> special forms MINimum, MAXimum and DEFault are accepted on input. MINimum allows to set the instrument to the smallest supported value. MAXimum allows to set the instrument to the greatest supported value. DEFault allows the instrument to select a value for the <AverageCount> parameter. The <numeric_value> represents the number of measures to average for the final measures. MIN, MAX and DEF can also be used as parameters.
Example(s)	SENS:AVER:COUN 12
See Also	SENSe:AVERage:COUNt? SENSe:AVERage:STATe SENSe:AVERage:STATe?

:SENSe[1..n]:AVERage:COUNt?

Description	This query returns the number of measurements used to perform an averaged measurement on the specified channel.
Syntax	:SENSe[1..n]:AVERage:COUNt?[<wsp>MINimum|MAXimum|DEFault]
Parameter(s)	*Parameter 1:* The program data syntax for the first parameter is defined as a <CHARACTER PROGRAM DATA> element. The allowed <CHARACTER PROGRAM DATA> elements for this parameter are: MINimum|MAXimum|DEFault. MINimum is used to retrieve the instrument's smallest supported value. MAXimum is used to retrieve the instrument's greatest supported value. DEFault is used to retrieve the instrument's default value.
Response Syntax	<AverageCount>

:SENSe[1..n]:AVERage:COUNt?

Response(s)	*AverageCount:* The response data syntax for <AverageCount> is defined as a <NR1 NUMERIC RESPONSE DATA> element. This query returns the number of measurements used to perform an averaged measurement.
Example(s)	SENS:AVER:COUN?
See Also	SENSe:AVERage:COUNt SENSe:AVERage:[STATe] SENSe:AVERage:[STATe]?

:SENSe[1..n]:CORRection:COLLect:ZERO

Description	This command performs an offset nulling on the specified channel.
Syntax	:SENSe[1..n]:CORRection:COLLect:ZERO
Parameter(s)	None
Example(s)	SENS1:CORR:COLL:ZERO
Notes	This command is not executed if a data acquisition is in progress. In that case, the "acquisition in progress" message will be returned. This command will take around 5 seconds to complete.
See Also	SENSe:CORRection:COLLect:ZERO:ALL ABORt

:SENSe[1..n]:CORRection:COLLect:ZERO:ALL

Description	This command performs an offset nulling measurement on all channels.
Syntax	:SENSe[1..n]:CORRection:COLLect:ZERO:ALL
Parameter(s)	None
Example(s)	SENS:CORR:COLL:ZERO:ALL
Notes	This command is not executed if a data acquisition is in progress. In that case, the "acquisition in progress" message will be returned. This command will take around 5 seconds to complete.
See Also	SENSe:CORRection:COLLect:ZERO ABORt

:SENSe[1..n]:CORRection:FACTor[:MAGNitude]

Description

This command sets a correction factor. The units are W/W by default.

Syntax

:SENSe[1..n]:CORRection:FACTor[:MAGNitude]<wsp><CorrectionFactor[<wsp>W/W|DB]>|MAXimum|MINimum|DEFault

Parameter(s)

CorrectionFactor:

The program data syntax for <CorrectionFactor> is defined as a <numeric_value> element followed by an optional <SUFFIX PROGRAM DATA> element. The allowed <SUFFIX PROGRAM DATA> elements are: W/W|DB. The <CorrectionFactor> special forms MINimum, MAXimum and DEFault are accepted on input.

MINimum allows to set the instrument to the smallest supported value.
MAXimum allows to set the instrument to the greatest supported value.

DEFault allows the instrument to select a value for the <CorrectionFactor> parameter.

The <numeric _value> parameter is a correction factor using W/W as units. If an invalid parameter is entered, the Parameter out of range message will be returned.

:SENSe[1..n]:CORRection:FACTor[:MAGNitude]	
Example(s)	SENS:CORR:FACT:MAGN 2
Notes	The correction factor expressed in W/W indicates the ratio between the power received (in W) and the reference (in W) for the current wavelength and channel.
See Also	SENSe:CORRection:FACTor:[MAGNitude]? SENSe:CORRection:OFFSet:[MAGNitude] SENSe:CORRection:OFFSet:[MAGNitude]?

:SENSe[1..n]:CORRection:FACTor[:MAGNitude]?

Description	This query returns the correction factor. The value is in W/W units.
Syntax	:SENSe[1..n]:CORRection:FACTor[:MAGNitude]?[<wsp>MINimum|MAXimum|DEFault]
Parameter(s)	*Parameter 1:* The program data syntax for the first parameter is defined as a <CHARACTER PROGRAM DATA> element. The allowed <CHARACTER PROGRAM DATA> elements for this parameter are: MINimum|MAXimum|DEFault. MINimum is used to retrieve the instrument's smallest supported value. MAXimum is used to retrieve the instrument's greatest supported value. DEFault is used to retrieve the instrument's default value.
Response Syntax	<CorrectionFactor>

:SENSe[1..n]:CORRection:FACTor [:MAGNitude]?

Response(s)	*CorrectionFactor:* The response data syntax for <CorrectionFactor> is defined as a <NR3 NUMERIC RESPONSE DATA> element. The correction factor for the current wavelength and channel is expressed in W/W. If a token is used, it will return the maximum, minimum or default value as specified.
Example(s)	SENS:CORR:FACT:MAGN?
See Also	SENSe:CORRection:FACTor:[MAGNitude] SENSe:CORRection:OFFSet:[MAGNitude] SENSe:CORRection:OFFSet:[MAGNitude]?

:SENSe[1..n]:CORRection:OFFSet[:MAGNitude]

Description

This command sets an offset value. The units are W/W by default.
If no channel was specified, the default channel used is 1.

Syntax

:SENSe[1..n]:CORRection:OFFSet[:MAGNitude] <wsp><CorrectionOffset[<wsp>W/W|DB]>|MAXimum|MINimum|DEFault

Parameter(s)

CorrectionOffset:

The program data syntax for <CorrectionOffset> is defined as a <numeric_value> element followed by an optional <SUFFIX PROGRAM DATA> element. The allowed <SUFFIX PROGRAM DATA> elements are: W/W|DB. The <CorrectionOffset> special forms MINimum, MAXimum and DEFault are accepted on input.

MINimum allows to set the instrument to the smallest supported value.
MAXimum allows to set the instrument to the greatest supported value.

:SENSe[1..n]:CORRection:OFFSet[:MAGNitude]

	DEFault allows the instrument to select a value for the <CorrectionOffset> parameter. Sets the offset for the specified channel.
Example(s)	SENS:CORR:OFFS:MAGN 2.0
See Also	SENSe:CORRection:OFFSet:[MAGNitude]? SENSe:CORRection:FACTort:[MAGNitude] SENSe:CORRection:FACTor:[MAGNitude]?

:SENSe[1..n]:CORRection:OFFSet[:MAGNitude]?

Description	This query returns the offset value in W/W. If no channel was specified, the default channel used is 1.
Syntax	:SENSe[1..n]:CORRection:OFFSet[:MAGNitude]?[<wsp>MINimum|MAXimum|DEFault]
Parameter(s)	*Parameter 1:* The program data syntax for the first parameter is defined as a <CHARACTER PROGRAM DATA> element. The allowed <CHARACTER PROGRAM DATA> elements for this parameter are: MINimum|MAXimum|DEFault. MINimum is used to retrieve the instrument's smallest supported value. MAXimum is used to retrieve the instrument's greatest supported value. DEFault is used to retrieve the instrument's default value.
Response Syntax	<CorrectionOffset>

:SENSe[1..n]:CORRection:OFFSet[:MAGNitude]?

Response(s)	*CorrectionOffset:* The response data syntax for <CorrectionOffset> is defined as a <NR3 NUMERIC RESPONSE DATA> element. This query returns the offset for the specified channel.
Example(s)	SENS:CORR:OFFS:MAGN?
See Also	SENSe:CORRection:OFFSet:[MAGNitude] SENSe:CORRection:FACTor:[MAGNitude] SENSe:CORRection:FACTor:[MAGNitude]?

:SENSe[1..n]:FREQuency:CONTinuous

Description	This command sets the continuous acquisition rate in Hz.
Syntax	:SENSe[1..n]:FREQuency:CONTinuous<wsp><ContinuousRate[<wsp>HZ]>
Parameter(s)	*ContinuousRate:* The program data syntax for <ContinuousRate> is defined as a <DECIMAL NUMERIC PROGRAM DATA> element followed by an optional <SUFFIX PROGRAM DATA> element. The allowed <SUFFIX PROGRAM DATA> element is HZ. The <numeric_value> parameter is the Continuous acquisition rate.
Example(s)	SENS:FREQ:CONT 256
Notes	This command is not executed if a data acquisition is in progress. In that case, the "acquisition in progress" message will be returned.
See Also	SENSe:FREQuency:CONTinuous? SENSe:FREQuency:CONTinuous:CATalog? SENSe:FREQuency:NCONtinuous SENSe:FREQuency:NCONtinuous? SENSe:FREQuency:NCONtinuous:CATalog?

:SENSe[1..n]:FREQuency:CONTinuous?

Description	This query returns the current continuous acquisition rate in Hz.
Syntax	:SENSe[1..n]:FREQuency:CONTinuous?
Parameter(s)	None
Response Syntax	<ContinuousRate>
Response(s)	*ContinuousRate:* The response data syntax for <ContinuousRate> is defined as a <NR2 NUMERIC RESPONSE DATA> element. This query returns the current Continuous acquisition rate.
Example(s)	SENS:FREQ:CONT?
See Also	SENSe:FREQuency:CONTinuous SENSe:FREQuency:CONTinuous:CATalog? SENSe:FREQuency:NCONtinuous SENSe:FREQuency:NCONtinuous? SENSe:FREQuency:NCONtinuous:CATalog?

:SENSe[1..n]:FREQuency:CONTinuous:CATalog?

Description	This query returns the list of available continuous acquisition rates in Hz.
Syntax	:SENSe[1..n]:FREQuency:CONTinuous:CATalog?
Parameter(s)	None
Response Syntax	<ContinuousList>
Response(s)	*ContinuousList:* The response data syntax for <ContinuousList> is defined as a <DEFINITE LENGTH ARBITRARY BLOCK RESPONSE DATA> element. This query returns the list of available Continuous acquisition rates.
Example(s)	SENS:FREQ:CONT:CAT?
See Also	SENSe:FREQuency:CONTinuous SENSe:FREQuency:CONTinuous? SENSe:FREQuency:NCONtinuous SENSe:FREQuency:NCONtinuous? SENSe:FREQuency:NCONtinuous:CATalog?

:SENSe[1..n]:FREQuency:NCONtinuous

Description	This command sets the single acquisition rate in Hz.
Syntax	:SENSe[1..n]:FREQuency:NCONtinuous<wsp><SingleRate[<wsp>HZ]>
Parameter(s)	*SingleRate:* The program data syntax for <SingleRate> is defined as a <DECIMAL NUMERIC PROGRAM DATA> element followed by an optional <SUFFIX PROGRAM DATA> element. The allowed <SUFFIX PROGRAM DATA> element is HZ. The <numeric_value> parameter is the Single acquisition rate.
Example(s)	SENS:FREQ:NCON 512
Notes	This command is not executed if a data acquisition is in progress. In that case, the "acquisition in progress" message will be returned.
See Also	SENSe:FREQuency:CONTinuous SENSe:FREQuency:CONTinuous? SENSe:FREQuency:CONTinuous:CATalog? SENSe:FREQuency:NCONtinuous? SENSe:FREQuency:NCONtinuous:CATalog?

:SENSe[1..n]:FREQuency:NCONtinuous?

Description	This query returns the current single acquisition rate in Hz.
Syntax	:SENSe[1..n]:FREQuency:NCONtinuous?
Parameter(s)	None
Response Syntax	<SingleRate>
Response(s)	*SingleRate:* The response data syntax for <SingleRate> is defined as a <NR2 NUMERIC RESPONSE DATA> element. This query returns the current Single acquisition rate.
Example(s)	SENS:FREQ:NCON?
See Also	SENSe:FREQuency:CONTinuous SENSe:FREQuency:CONTinuous? SENSe:FREQuency:CONTinuous:CATalog? SENSe:FREQuency:NCONtinuous SENSe:FREQuency:NCONtinuous:CATalog?

:SENSe[1..n]:FREQuency:NCONtinuous:CATalog?

Description	This query returns the list of available single acquisition rates in Hz.
Syntax	:SENSe[1..n]:FREQuency:NCONtinuous:CATalog?
Parameter(s)	None
Response Syntax	<NonContinuousList>
Response(s)	*NonContinuousList:* The response data syntax for <NonContinuousList> is defined as a <DEFINITE LENGTH ARBITRARY BLOCK RESPONSE DATA> element. This query return the list of available Single acquisition rates.
Example(s)	SENS:FREQ:NCON:CAT?
See Also	SENSe:FREQuency:CONTinuous SENSe:FREQuency:CONTinuous? SENSe:FREQuency:CONTinuous:CAT? SENSe:FREQuency:NCONtinuous SENSe:FREQuency:NCONtinuous?

:SENSe[1..n]:POWer[:DC]:RANGe:AUTO

Description	This command enables or disables the automatic power measurement range (Autorange) for the currently selected channel.
Syntax	:SENSe[1..n]:POWer[:DC]:RANGe:AUTO<wsp><AutoRangeState>
Parameter(s)	*AutoRangeState:* The program data syntax for <AutoRangeState> is defined as a <Boolean Program Data> element. The <AutoRangeState> special forms ON and OFF are accepted on input for increased readability. ON corresponds to 1 and OFF corresponds to 0. Set the <AutoRangeState>, where: 0 or OFF -Disables the AutoRange 1 or ON -Enables the AutoRange
Example(s)	SENS:POW:RANG:AUTO 1
Notes	When Autorange is deactivated, S1 is activated by default.
See Also	SENSe:POWer:[DC]:RANGe:AUTO? SENSe:POWer:[DC]:RANGe SENSe:POWer:[DC]:RANGe:SCALe SENSe:POWer:[DC]:RANGe:SCALe? SENSe:POWer:[DC]:RANGe:SCALe:LIST?

:SENSe[1..n]:POWer[:DC]:RANGe:AUTO?

Description	This query returns a value indicating whether the automatic power measurement range (Autorange) is enabled or disabled for the specified channel.
Syntax	:SENSe[1..n]:POWer[:DC]:RANGe:AUTO?
Parameter(s)	None
Response Syntax	<Autorange>
Response(s)	*Autorange:* The response data syntax for <Autorange> is defined as a <NR1 NUMERIC RESPONSE DATA> element. The current <AutoRange> state, where: 0 - the autorange is disabled. 1 - the autorange is enabled.
Example(s)	SENS:POW:RANG:AUTO?
See Also	SENSe:POWer:[DC]:RANGe:AUTO SENSe:POWer:[DC]:RANGe SENSe:POWer:[DC]:RANGe:SCALe SENSe:POWer:[DC]:RANGe:SCALe? SENSe:POWer:[DC]:RANGe:SCALe:LIST?

:SENSe[1..n]:POWer[:DC]:RANGe:SCALe

Description	This command sets the measurement range.
Syntax	:SENSe[1..n]:POWer[:DC]:RANGe:SCALe<wsp><Scale>
Parameter(s)	*Scale:* The program data syntax for <Scale> is defined as a <STRING PROGRAM DATA> element. Sets the scale for the specified channel Auto -Automatic range S1 -Scale 1 S2 - Scale 2
Example(s)	SENS:POW:RANG:SCAL "S1"
See Also	SENSe:POWer:[DC]:RANGe:SCALe? SENSe:POWer:[DC]:RANGe:AUTO SENSe:POWer:[DC]:RANGe:AUTO? SENSe:POWer:[DC]:RANGe:SCALe:LIST?

:SENSe[1..n]:POWer[:DC]:RANGe:SCALe?

Description	This query returns the currently selected measurement range.
Syntax	:SENSe[1..n]:POWer[:DC]:RANGe:SCALe?
Parameter(s)	None
Response Syntax	<Range>
Response(s)	*Range:* The response data syntax for <Range> is defined as a <STRING RESPONSE DATA> element. Current power range, where: Auto - Automatic range S1 - Scale 1 S2 - Scale 2
Example(s)	SENS:POW:RANG:SCAL?
See Also	SENSe:POWer:[DC]:RANGe:SCALe SENSe:POWer:[DC]:RANGe:AUTO SENSe:POWer:[DC]:RANGe:AUTO? SENSe:POWer:[DC]:RANGe:SCALe:LIST?

:SENSe[1..n]:POWer[:DC]:RANGe:SCALe:LIST?

Description	This query returns the list of supported scales.
Syntax	:SENSe[1..n]:POWer[:DC]:RANGe:SCALe:LIST?
Parameter(s)	None
Response Syntax	<RangePowerList>
Response(s)	*RangePowerList:* The response data syntax for <RangePowerList> is defined as a <DEFINITE LENGTH ARBITRARY BLOCK RESPONSE DATA> element. This query returns the list of power ranges supported. Each value is of NR2 type and is standardized at 1310 nm. Format: S1, PowerMin, PowerMax, … Units: Watt
Example(s)	SENS:POW:RANG:SCAL:LIST?
See Also	SENSe:POWer:[DC]:RANGe:AUTO SENSe:POWer:[DC]:RANGe:AUTO? SENSe:POWer:[DC]:RANGe:SCALe SENSe:POWer:[DC]:RANGe:SCALe?

:SENSe[1..n]:POWer[:DC]:REFerence

Description

This command sets the reference power on the specified channel in watts.

Syntax

:SENSe[1..n]:POWer[:DC]:REFerence<wsp><Reference[<wsp>W|DBM]>|MAXimum|MINimum|DEFault

Parameter(s)

Reference:

The program data syntax for <Reference> is defined as a <numeric_value> element followed by an optional <SUFFIX PROGRAM DATA> element. The allowed <SUFFIX PROGRAM DATA> elements are: W|DBM. The <Reference> special forms MINimum, MAXimum and DEFault are accepted on input.

MINimum allows to set the instrument to the smallest supported value.
MAXimum allows to set the instrument to the greatest supported value.

:SENSe[1..n]:POWer[:DC]:REFerence

	DEFault allows the instrument to select a value for the <Reference> parameter. Sets the reference for the specified channel. MIN, MAX and DEF can also be used as parameters.
Example(s)	SENS:POW:REF 5
See Also	SENSe:POWer:[DC]:REFerence? SENSe:POWer:[DC]:REFerence:ALL SENSe:POWer:[DC]:REFerence:DISPlay SENSe:POWer:[DC]:REFerence:STATe SENSe:POWer:[DC]:REFerence:STATe?

:SENSe[1..n]:POWer[:DC]:REFerence?

Description	This query returns the reference power in watts on the specified channel.
Syntax	:SENSe[1..n]:POWer[:DC]:REFerence?[<wsp>MINimum|MAXimum|DEFault]
Parameter(s)	*Parameter 1:* The program data syntax for the first parameter is defined as a <CHARACTER PROGRAM DATA> element. The allowed <CHARACTER PROGRAM DATA> elements for this parameter are: MINimum|MAXimum|DEFault. MINimum is used to retrieve the instrument's smallest supported value. MAXimum is used to retrieve the instrument's greatest supported value. DEFault is used to retrieve the instrument's default value.
Response Syntax	<Reference>

:SENSe[1..n]:POWer[:DC]:REFerence?

Response(s)

Reference:

The response data syntax for <Reference> is defined as a <NR3 NUMERIC RESPONSE DATA> element.

This query returns the reference value for the specified channel.

Example(s)

SENS:POW:REF?

See Also

SENSe:POWer:[DC]:REFerence
SENSe:POWer:[DC]:REFerence:ALL
SENSe:POWer:[DC]:REFerence:DISPlay
SENSe:POWer:[DC]:REFerence:STATe
SENSe:POWer:[DC]:REFerence:STATe?

:SENSe[1..n]:POWer[:DC]:REFerence:ALL

Description	This command performs a new reference measurement and changes the display to show relative power (dB or W/W) for all channels.
Syntax	:SENSe[1..n]:POWer[:DC]:REFerence:ALL
Parameter(s)	None
Example(s)	SENS:POW:REF:ALL SENS:POW:REF? SENS2:POW:REF?
Notes	This command is not executed if a data acquisition is in progress. In that case, the "Acquisition in progress" message will be returned.
See Also	SENSe:POWer:[DC]:REFerence SENSe:POWer:[DC]:REFerence? SENSe:POWer:[DC]:REFerence:DISPlay SENSe:POWer:[DC]:REFerence:STATe SENSe:POWer:[DC]:REFerence:STATe?

:SENSe[1..n]:POWer[:DC]:REFerence:DISPlay

Description	This command performs a new reference measurement and changes the display to show relative power (dB or W/W) for the specified channel.
Syntax	:SENSe[1..n]:POWer[:DC]:REFerence:DISPlay
Parameter(s)	None
Example(s)	SENS:POW:REF:DISP SENS:POW:REF?
Notes	This command is not executed if a data acquisition is in progress. In that case, the "Acquisition in progress" message will be returned.
See Also	SENSe:POWer:[DC]:REFerence SENSe:POWer:[DC]:REFerence? SENSe:POWer:[DC]:REFerence:ALL SENSe:POWer:[DC]:REFerence:STATe SENSe:POWer:[DC]:REFerence:STATe?

:SENSe[1..n]:POWer[:DC]:REFerence:STATe

Description

This command selects whether absolute (dBm or W) or relative (dB or W/W) power measurements are performed.

Syntax

:SENSe[1..n]:POWer[:DC]:REFerence:STATe<wsp><ReferenceState>

Parameter(s)

ReferenceState:

The program data syntax for <ReferenceState> is defined as a <Boolean Program Data> element. The <ReferenceState> special forms ON and OFF are accepted on input for increased readability. ON corresponds to 1 and OFF corresponds to 0.

The <ReferenceState> parameter is a boolean value representing either dB and W, or dBm and W/W:
0 or OFF - selects absolute units (dBm or W).
1 or ON - selects relative units (dB or W/W).

Example(s)

SENS:POW:REF:STAT 1

Notes

This command is not executed if a data acquisition is in progress. In that case, the "Acquisition in progress" message will be returned.

See Also

SENSe:POWer:[DC]:REFerence
SENSe:POWer:[DC]:REFerence?
SENSe:POWer:[DC]:REFerence:ALL
SENSe:POWer:[DC]:REFerence:DISPlay
SENSe:POWer:[DC]:REFerence:STATe?

:SENSe[1..n]:POWer[:DC]:REFerence:STATe?

Description	This query returns a value indicating whether the power meter is displaying absolute (dBm or W) or relative (dB or W/W) power values for the specified channel.
Syntax	:SENSe[1..n]:POWer[:DC]:REFerence:STATe?
Parameter(s)	None
Response Syntax	<ReferenceState>
Response(s)	*ReferenceState:* The response data syntax for <ReferenceState> is defined as a <CHARACTER RESPONSE DATA> element. Current reference mode, where: 0 - is the absolute mode (dBm or W). 1 - is the relative mode (dB or W/W).
Example(s)	SENS:POW:REF:STAT?
See Also	SENSe:POWer:[DC]:REFerence SENSe:POWer:[DC]:REFerence? SENSe:POWer:[DC]:REFerence:ALL SENSe:POWer:[DC]:REFerence:DISPlay SENSe:POWer:[DC]:REFerence:STATe

:SENSe[1..n]:POWer:WAVelength

Description	This command selects a new operating wavelength on the specified channel. If no channel was specified, the default value used is 1.
Syntax	:SENSe[1..n]:POWer:WAVelength<wsp><Wavelength>|MAXimum|MINimum|DEFault
Parameter(s)	*Wavelength:* The program data syntax for <Wavelength> is defined as a <numeric_value> element. The <Wavelength> special forms MINimum, MAXimum and DEFault are accepted on input. MINimum allows to set the instrument to the smallest supported value. MAXimum allows to set the instrument to the greatest supported value. DEFault allows the instrument to select a value for the <Wavelength> parameter. The <wavelength> parameter is an operating wavelength using meter as units. Any wavelength within the spectral range of the instrument optical detector at a resolution of 0.01 nm may be selected.
Example(s)	SENS:POW:WAV 0.00000131002 or SENS:POW:WAV 1310.02 nm
Notes	See the instrument's user guide for the exact spectral range for each detector type.
See Also	SENSe:POWer:WAVelength?

:SENSe[1..n]:POWer:WAVelength?

Description	This query returns the currently selected wavelength on the specified channel. If no channel was specified, the default value used is 1.
Syntax	:SENSe[1..n]:POWer:WAVelength?[<wsp>MINimum|MAXimum|DEFault]
Parameter(s)	*Parameter 1:* The program data syntax for the first parameter is defined as a <CHARACTER PROGRAM DATA> element. The allowed <CHARACTER PROGRAM DATA> elements for this parameter are: MINimum|MAXimum|DEFault. MINimum is used to retrieve the instrument's smallest supported value. MAXimum is used to retrieve the instrument's greatest supported value. DEFault is used to retrieve the instrument's default value.
Response Syntax	<Wavelength>
Response(s)	*Wavelength:* The response data syntax for <Wavelength> is defined as a <NR3 NUMERIC RESPONSE DATA> element. This query returns the current wavelength in meters for the specified channel.
Example(s)	SENS:POW:WAV?
See Also	SENSe:POWer:WAVelength

:SLINstrument:CATalog?

Description	This query returns a comma-separated list of <STRING RESPONSE DATA>, which contains the names of all channels of the module. If no channels are defined, a single null <STRING RESPONSE DATA> is returned. This is not affected by a *RST command.
Syntax	:SLINstrument:CATalog?
Parameter(s)	None
Response Syntax	<Catalog>
Response(s)	*Catalog:* The response data syntax for <Catalog> is defined as a <STRING RESPONSE DATA> element. The list of <STRING RESPONSE DATA> contains the names of all channels in the module.
Example(s)	SLIN:CAT?
See Also	SLINstrument:CATalog:FULL?

:SLINstrument:CATalog:FULL?

Description	This query returns a list of <STRING RESPONSE DATA> - <NR1 NUMERIC RESPONSE DATA> pairs. The <STRING RESPONSE DATA> contains the names of the channels. The immediately following <NR1 NUMERIC RESPONSE DATA> formatted number is the associated channel number. All response data elements are separated by commas. If no channels are defined, a null <STRING RESPONSE DATA> value, followed by a zero, is returned.
Syntax	:SLINstrument:CATalog:FULL?
Parameter(s)	None
Response Syntax	<Catalog>
Response(s)	*Catalog:* The response data syntax for <Catalog> is defined as a <STRING RESPONSE DATA> element. The list of <STRING RESPONSE DATA> contains the names of all channels in the module. The immediately following <NR1 NUMERIC RESPONSE DATA> formatted number is the associated channel number.
Example(s)	SLIN:CAT:FULL?
See Also	SLINstrument:CATalog?

:SNUMber?	
Description	This query returns a value indicating the module's serial number.
Syntax	:SNUMber?
Parameter(s)	None
Response Syntax	<SerialNumber>
Response(s)	*SerialNumber:* The response data syntax for <SerialNumber> is defined as a <STRING RESPONSE DATA> element. The <SerialNumber> response represents a string containing the modules serial number.
Example(s)	SNUM? Returns "123456-AB"

:STATus?

Description	This query returns a value indicating the status of the module (READY, BUSY, etc.).
Syntax	:STATus?
Parameter(s)	None
Response Syntax	<Status>
Response(s)	*Status:* The response data syntax for <Status> is defined as a <CHARACTER RESPONSE DATA> element. The <Status> response represents the module state, where: UNINITIALIZED, means the module is not initialized. INITINPROGRESS, means the module initialization is in progress, READY, means the module is ready, BUSY, means the module is busy, DISCONNECTED, means the module is disconnected, DEFECTIVE, means the module is defective and UNCONFIGURED, means the module is not configured.
Example(s)	STAT? Returns READY (Module is ready.)

:STATus:OPERation:BIT[1..n]:CONDition?

Description	This query returns the state of a specific bit. For the moment, only bit <8> was developed. This bit is used to return the state of the module. If the bit = 0, the module is ready. If the bit = 1, the module is busy.
Syntax	:STATus:OPERation:BIT[1..n]:CONDition?
Parameter(s)	None
Response Syntax	<StatusOperation>
Response(s)	*StatusOperation:* The response data syntax for <StatusOperation> is defined as a <NR3 NUMERIC RESPONSE DATA> element. This query returns the state of the module. If the response = 1, the module is busy, if the response = 0, the module is ready to receive commands.
Example(s)	STAT:OPER:BIT8:COND?
See Also	MMEMory:ACQuisition?

:TRACe[1..n][:DATA]?

Description	Returns all points in a trace.
Syntax	:TRACe[1..n][:DATA]?<wsp>TRC1|TRC2|TRC3|TRC4
Parameter(s)	*Trace:* The program data syntax for the first parameter is defined as a <CHARACTER PROGRAM DATA> element. The allowed <CHARACTER PROGRAM DATA> elements for this parameter are: TRC1|TRC2|TRC3|TRC4. This parameter is used to select the trace for which you want to see the points. Each trace corresponds to a channel: TRC1 - acquisition made on channel 1 TRC2 - acquisition made on channel 2 TRC3 - acquisition made on channel 3 TRC4 - acquisition made on channel 4
Response Syntax	<TraceData>
Response(s)	*TraceData:* The response data syntax for <TraceData> is defined as a <DEFINITE LENGTH ARBITRARY BLOCK RESPONSE DATA> element. This query returns all power measurements for the specified trace.

:TRACe[1..n][:DATA]?

	Each power value represents a point in the trace and is returned in the same unit used to perform the acquisition. The number of values in a trace can be retrieved with the TRACe:POINt query.
Example(s)	TRAC:POIN TRC1, 10 INIT:AUTO 1, CONT TRAC? TRC1 TRAC? TRC2
Notes	A trace must be acquired prior to using this query. The suffix of TRACe[1..n] is not useful for this command.
See Also	TRACe:MAX? TRACe:MIN? TRACe:POINts TRACe:POINts?

:TRACe[1..n]:MAX?

Description	This query returns the maximum value for the specified trace.
Syntax	:TRACe[1..n]:MAX?<wsp>TRC1|TRC2|TRC3|TRC4
Parameter(s)	*Trace:* The program data syntax for the first parameter is defined as a <CHARACTER PROGRAM DATA> element. The allowed <CHARACTER PROGRAM DATA> elements for this parameter are: TRC1|TRC2|TRC3|TRC4. This parameter is used to select the trace to use. Each trace corresponds to a channel: TRC1 - acquisition made on channel 1 TRC2 - acquisition made on channel 2 TRC3 - acquisition made on channel 3 TRC4 - acquisition made on channel 4
Response Syntax	<PointMax>
Response(s)	*PointMax:* The response data syntax for <PointMax> is defined as a <NR3 NUMERIC RESPONSE DATA> element. The response corresponds to the highest value in the specified trace. The maximum trace point is returned in the same unit used to perform the acquisition.

:TRACe[1..n]:MAX?

Example(s)	INIT:EXTR 1 INIT:EXTR 0 TRAC:MAX? TRC1
Notes	A trace must be acquired prior to using this query. The suffix of TRACe[1..n] is not useful for this command.
See Also	TRACe:[DATA]? INITiate:EXTRema TRACe:MIN? TRACe:POINts TRACe:POINts?

:TRACe[1..n]:MIN?

Description	This query returns minimum value in the trace.
Syntax	:TRACe[1..n]:MIN?<wsp>TRC1|TRC2|TRC3|TRC4
Parameter(s)	*Trace:* The program data syntax for the first parameter is defined as a <CHARACTER PROGRAM DATA> element. The allowed <CHARACTER PROGRAM DATA> elements for this parameter are: TRC1|TRC2|TRC3|TRC4. This parameter allows to select the trace to use. Each trace corresponds to a channel: TRC1 - acquisition made on channel 1 TRC2 - acquisition made on channel 2 TRC3 - acquisition made on channel 3 TRC4 - acquisition made on channel 4
Response Syntax	<PointMin>
Response(s)	*PointMin:* The response data syntax for <PointMin> is defined as a <NR3 NUMERIC RESPONSE DATA> element. The response corresponds to the smallest value in the specified trace. The minimum trace point is returned in the same unit used to perform the acquisition.

:TRACe[1..n]:MIN?

Example(s)	INIT:EXTR 1 INIT:EXTR 0 TRAC:MIN? TRC1
Notes	A trace must be acquired prior to using this query. The suffix of TRACe[1..n] is not useful for this command.
See Also	TRACe:[DATA]? INITiate:EXTRema TRACe:MAX? TRACe:POINts TRACe:POINts?

:TRACe[1..n]:POINts

Description

This command sets the number of points to store for all traces.
The sufix [1..n], appearing after the keyword "TRACe", is not used.

Syntax

:TRACe[1..n]:POINts<wsp>TRC1|TRC2|TRC3|TRC4[,<NumberPoint>]

Parameter(s)

➤ *Trace:*

The program data syntax for the first parameter is defined as a <CHARACTER PROGRAM DATA> element. The allowed <CHARACTER PROGRAM DATA> elements for this parameter are: TRC1|TRC2|TRC3|TRC4.

This parameter is used to select the trace to use. Each trace corresponds to a channel:
TRC1 - acquisition made on channel 1
TRC2 - acquisition made on channel 2
TRC3 - acquisition made on channel 3
TRC4 - acquisition made on channel 4

➤ *NumberPoint:*

The program data syntax for <NumberPoint> is defined as a <DECIMAL NUMERIC PROGRAM DATA> element.

<NumberPoint> sets the maximum number of points for subsequent acquisitions.
If no parameter is entered, the default value is used.

:TRACe[1..n]:POINts	
Example(s)	TRAC:POIN TRC1,5
Notes	This command interacts with the MMEM:ACQ:DUR and SENS:FREQ commands. For a given SENS:FREQ, this command will influence the duration. In normal operation, either the MMEM:ACQ:DUR or this command should be used.
See Also	TRACe:[DATA]? TRACe:MAX? TRACe:MIN? TRACe:POINts? MMEM:ACQ:DUR

:TRACe[1..n]:POINts?

Description	This query returns the number of points in a specified trace. The sufix [1..n], appearing after the keyword "TRACe", is not used.
Syntax	:TRACe[1..n]:POINts?<wsp>TRC1|TRC2|TRC3|TRC4
Parameter(s)	*Trace:* The program data syntax for the first parameter is defined as a <CHARACTER PROGRAM DATA> element. The allowed <CHARACTER PROGRAM DATA> elements for this parameter are: TRC1|TRC2|TRC3|TRC4. This parameter allows to select the trace to use. Each trace corresponds to a channel: TRC1 - acquisition for channel 1 TRC2 - acquisition for channel 2 TRC3 - acquisition for channel 3 TRC4 - acquisition for channel 4
Response Syntax	<PointsCount>
Response(s)	*PointsCount:* The response data syntax for <PointsCount> is defined as a <NR1 NUMERIC RESPONSE DATA> element. Number of points in the specified trace.

:TRACe[1..n]:POINts?	
Example(s)	TRAC:POIN? TRC1
Notes	The suffix of TRACe[1..n] is not useful for this command.
See Also	TRACe:[DATA]? TRACe:MAX? TRACe:MIN? TRACe:POINts

:TRIGger:POSition

Description

This command sets the position of the trigger. The percentage (in 5% steps from 5 % to 50 %) applies to Single acquisitions file mode (MMEM:ACQ 1,NCON) and to programmed acquisitions (INIT:AUTO 1,NCON).

For a file acquisition, it is the percentage of the total duration (for example, 50 % of 10 seconds equals 5 seconds before the trigger and 5 econds after the trigger).
For a programmed acquisition, it is the percentage of the points (for example, 25 % of 1000 points equals 250 points before the trigger and 750 points after the trigger).

Syntax

:TRIGger:POSition<wsp><TriggerPosition>

Parameter(s)

TriggerPosition:

The program data syntax for <TriggerPosition> is defined as a <DECIMAL NUMERIC PROGRAM DATA> element.

The <numeric value> represents the trigger position and can be:
0 - 0 %
5 - 5 %
10 -10 %
…

:TRIGger:POSition	
	45 - 45% 50 - 50%
Example(s)	TRIG:POS 20
See Also	TRIGger:POSition? TRIGger:POSition:CATalog? TRIGger[:SEQuence]:LEVel TRIGger[:SEQuence]:STATe TRIGger[:SEQuence]:SOURce TRIGger[:SEQuence]:SLOPe

:TRIGger:POSition?

Description	This query returns a value indicating the position of the trigger. This value determines the percentage of points that will be acquired in Single acquisition mode before the trigger is met.
Syntax	:TRIGger:POSition?
Parameter(s)	None
Response Syntax	<TriggerPosition>
Response(s)	*TriggerPosition:* The response data syntax for <TriggerPosition> is defined as a <NR1 NUMERIC RESPONSE DATA> element. This query returns the percentage of points before the trigger.
Example(s)	TRIG:POS?
See Also	TRIGger:POSition TRIGger:POSition:CATalog? TRIGger[:SEQuence]:LEVel TRIGger[:SEQuence]:STATe TRIGger[:SEQuence]:SOURce TRIGger[:SEQuence]:SLOPe

:TRIGger:POSition:CATalog?

Description	This query returns a list of available values for the trigger position. These values determine the percentage of points that will be acquired in Single acquisition mode before the trigger is met.
Syntax	:TRIGger:POSition:CATalog?
Parameter(s)	None
Response Syntax	<TriggerList>
Response(s)	*TriggerList:* The response data syntax for <TriggerList> is defined as a <DEFINITE LENGTH ARBITRARY BLOCK RESPONSE DATA> element. The response corresponds to the list of available trigger positions.
Example(s)	TRIG:POS:CAT?
See Also	TRIGger[:SEQuence]:LEVel TRIGger:POSition TRIGger[:SEQuence]:STATe TRIGger[:SEQuence]:SOURce TRIGger[:SEQuence]:SLOPe

:TRIGger[:SEQuence]:LEVel

Description	This command sets the power level of the trigger condition to be met before starting an acquisition in W or W/W depending on the selected unit.
Syntax	:TRIGger[:SEQuence]:LEVel<wsp><TriggerPowerLevel>
Parameter(s)	*TriggerPowerLevel:* The program data syntax for <TriggerPowerLevel> is defined as a <DECIMAL NUMERIC PROGRAM DATA> element. Sets the power level of the trigger.
Example(s)	TRIG:SEQ:LEV 1E-6
See Also	TRIGger[:SEQuence]:LEVel? TRIGger:POSition TRIGger:POSition:CATalog? TRIGger[:SEQuence]:STATe TRIGger[:SEQuence]:SOURce TRIGger[:SEQuence]:SLOPe

:TRIGger[:SEQuence]:LEVel?

Description	This query returns the power level of the trigger condition to be met before starting an acquisition.
Syntax	:TRIGger[:SEQuence]:LEVel?
Parameter(s)	None
Response Syntax	<TriggerPowerLevel>
Response(s)	*TriggerPowerLevel:* The response data syntax for <TriggerPowerLevel> is defined as a <NR3 NUMERIC RESPONSE DATA> element. This query returns the trigger power level in W or W/W, depending on the selected unit.
Example(s)	TRIG:SEQ:LEV?
See Also	TRIGger[:SEQuence]:LEVel TRIGger:POSition TRIGger:POSition:CATalog? TRIGger[:SEQuence]:STATe TRIGger[:SEQuence]:SOURce TRIGger[:SEQuence]:SLOPe

:TRIGger[:SEQuence]:SLOPe

Description	This command sets the edge status of the trigger condition. It defines whether acquisitions will be triggered on positive or negative transitions.
Syntax	:TRIGger[:SEQuence]:SLOPe<wsp>NEGative|POSitive
Parameter(s)	*Slope:* The program data syntax for the first parameter is defined as a <CHARACTER PROGRAM DATA> element. The allowed <CHARACTER PROGRAM DATA> elements for this parameter are: NEGative|POSitive. This parameter sets the trigger edge. NEGative - represents a falling edge trigger. POSitive - represents a rising edge trigger.
Example(s)	TRIG:SEQ:SLOP POS
Notes	the trigger slope also influences the internal triggers. A positive slope on an internal trigger implies INTERNALx > LEVEL. A negative slope on an internal trigger implies INTERNALx < LEVEL.
See Also	TRIGger{:SEQuence]:SLOPe? TRIGger[:SEQuence]:LEVel TRIGger:POSition TRIGger:POSition:CATalog? TRIGger[:SEQuence]:STATe TRIGger[:SEQuence]:SOURce

:TRIGger[:SEQuence]:SLOPe?

Description	This query returns the rising or falling edge status of the trigger condition. It defines whether positive or negative transitions will trigger the acquisition.
Syntax	:TRIGger[:SEQuence]:SLOPe?
Parameter(s)	None
Response Syntax	<Slope>
Response(s)	*Slope:* The response data syntax for <Slope> is defined as a <CHARACTER RESPONSE DATA> element. The edge used for trigger acquisition, where: 0 or NEGative -Falling edge trigger. 1 or POSitive -Rising edge trigger.
Example(s)	TRIG:SEQ:SLOP?
See Also	TRIGger{:SEQuence]:SLOPe TRIGger[:SEQuence]:LEVel TRIGger:POSition TRIGger:POSition:CATalog? TRIGger[:SEQuence]:STATe TRIGger[:SEQuence]:SOURce

:TRIGger[:SEQuence]:SOURce

Description	This command sets the trigger condition's source.
Syntax	:TRIGger[:SEQuence]:SOURce<wsp>EXTernal|INTernal1|INTernal2|INTernal3|INTernal4|INTernal5|INTernal6
Parameter(s)	*Source:* The program data syntax for the first parameter is defined as a <CHARACTER PROGRAM DATA> element. The allowed <CHARACTER PROGRAM DATA> elements for this parameter are: EXTernal|INTernal1|INTernal2|INTernal3|INTernal4|INTernal5|INTernal6. This parameter represents the trigger source. EXTernal - is the external trigger INTernal1 - is channel 1 INTernal2 - is channel 2 INTernal3 - is channel 3 INTernal4 - is channel 4
Example(s)	TRIG:SEQ:SOUR EXT
See Also	TRIGger[:SEQuence]:SOURce? TRIGger[:SEQuence]:LEVel? TRIGger:POSition TRIGger:POSition:CATalog? TRIGger[:SEQuence]:STATe TRIGger[:SEQuence]:SLOPe

:TRIGger[:SEQuence]:SOURce?

Description	This query returns the trigger condition's source.
Syntax	:TRIGger[:SEQuence]:SOURce?
Parameter(s)	None
Response Syntax	<TriggerSource>
Response(s)	*TriggerSource:* The response data syntax for <TriggerSource> is defined as a <CHARACTER RESPONSE DATA> element. The current trigger source, where: EXTernal - is the external trigger INTernal1 - is channel 1 INTernal2 - is channel 2 INTernal3 - is channel 3 INTernal4 - is channel 4
Example(s)	TRIG:SEQ:SOUR?
See Also	TRIGger[:SEQuence]:SOURce TRIGger[:SEQuence]:LEVel? TRIGger:POSition TRIGger:POSition:CATalog? TRIGger[:SEQuence]:STATe TRIGger[:SEQuence]:SLOPe

:TRIGger[:SEQuence]:STATe

Description	This command sets the state of the trigger condition.
Syntax	:TRIGger[:SEQuence]:STATe<wsp><TriggerState>
Parameter(s)	*TriggerState:* The program data syntax for <TriggerState> is defined as a <Boolean Program Data> element. The <TriggerState> special forms ON and OFF are accepted on input for increased readability. ON corresponds to 1 and OFF corresponds to 0. This parameter sets the trigger state. 0 - Trigger condition deactivated 1 - Trigger condition activated
Example(s)	TRIG:SEQ:STAT 0
See Also	TRIGger[:SEQuence]:STATe? TRIGger[:SEQuence]:LEVel TRIGger:POSition TRIGger:POSition:CATalog? TRIGger[:SEQuence]:SOURce TRIGger[:SEQuence]:SLOPe

:TRIGger[:SEQuence]:STATe?

Description	This query returns the status of the trigger condition.
Syntax	:TRIGger[:SEQuence]:STATe?
Parameter(s)	None
Response Syntax	<TriggerState>
Response(s)	*TriggerState:* The response data syntax for <TriggerState> is defined as a <NR1 NUMERIC RESPONSE DATA> element. Current trigger condition status, where: 0 - The trigger is inactive. 1 - The trigger is active.
Example(s)	TRIG:SEQ:STAT?
See Also	TRIGger[:SEQuence]:STATe TRIGger[:SEQuence]:LEVel TRIGger:POSition TRIGger:POSition:CATalog? TRIGger[:SEQuence]:SOURce TRIGger[:SEQuence]:SLOPe

:UNIT[1..n]:POWer

Description	The parameter corresponds to the power units for the specified channel.
Syntax	:UNIT[1..n]:POWer<wsp>DB|DBM|W|W/W|WATT|WATT/WATT
Parameter(s)	*Unit:* The program data syntax for the first parameter is defined as a <CHARACTER PROGRAM DATA> element. The allowed <CHARACTER PROGRAM DATA> elements for this parameter are: DB|DBM|W|W/W|WATT|WATT/WATT. Sets the power unit for the specified channel.
Example(s)	UNIT:POW DBM
Notes	This command is not executed if a data acquisition is in progress. In that case, the "Acquisition in progress" message will be returned.
See Also	UNIT:POWer?

:UNIT[1..n]:POWer?

Description	This query returns the current power unit for the specified channel.
Syntax	:UNIT[1..n]:POWer?
Parameter(s)	None
Response Syntax	<PowerUnit>
Response(s)	*PowerUnit:* The response data syntax for <PowerUnit> is defined as a <CHARACTER RESPONSE DATA> element. This response corresponds to the current power unit for the specified channel.
Example(s)	UNIT:POW?
See Also	UNIT:POWer

B REST Command Reference

A complete list of the REST commands for your unit is available at all times online. It details the commands with examples and appropriate syntax.

To view the REST command documentation:

From your internet browser, go to the following address:

http://[IP address of your platform]/FTBx1750/help.

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CHINESE REGULATION ON RESTRICTION OF HAZARDOUS SUBSTANCES (RoHS)
中国关于危害物质限制的规定

NAMES AND CONTENTS OF THE TOXIC OR HAZARDOUS SUBSTANCES OR ELEMENTS CONTAINED IN THIS EXFO PRODUCT
包含在本 EXFO 产品中的有毒有害物质或元素的名称及含量

Part Name 部件名称	Lead 铅 （Pb）	Mercury 汞 （Hg）	Cadmium 镉 （Cd）	Hexavalent Chromium 六价铬 （Cr(VI)）	Polybrominated biphenyls 多溴联苯 （PBB）	Polybrominated diphenyl ethers 多溴二苯醚 （PBDE）
Enclosure 外壳	O	O	O	O	O	O
Electronic and electrical sub-assembly 电子和电气组件	X	O	X	O	X	X
Optical sub-assembly[a] 光学组件 [a]	X	O	O	O	O	O
Mechanical sub-assembly[a] 机械组件 [a]	O	O	O	O	O	O

Note:
注：
This table is prepared in accordance with the provisions of SJ/T 11364.
本表依据 SJ/T 11364 的规定编制。
O: Indicates that said hazardous substance contained in all of the homogeneous materials for this part is below the limit requirement of GB/T 26572.
O：表示该有害物质在该部件所有均质材料中的含量均在 GB/T 26572 标准规定的限量要求以下。
X: indicates that said hazardous substance contained in at least one of the homogeneous materials used for this part is above the limit requirement of GB/T 26572. Due to the limitations in current technologies, parts with the “X” mark cannot eliminate hazardous substances.
X：表示该有害物质至少在该部件的某一均质材料中的含量超出 GB/T 26572 标准规定的限量要求。
标记“X”的部件，皆因全球技术发展水平限制而无法实现有害物质的替代。
a. If applicable.
如果适用。

MARKING REQUIREMENTS
标注要求

Product 产品	Environmental protection use period (years) 环境保护使用期限 （年）	Logo 标志
This EXFO product 本 EXFO 产品	10	
Battery[a] 电池	5	

a. If applicable.
如果适用。

P/N: 1080977

www.EXFO.com · info@EXFO.com

CORPORATE HEADQUARTERS 400 Godin Avenue Quebec (Quebec) G1M 2K2 CANADA
Tel.: 1 418 683-0211 · Fax: 1 418 683-2170

TOLL-FREE (USA and Canada) 1 800 663-3936

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