POWER METER AND OPTICAL HEAD SERIES

1600/1700

IQS-1600/IQS-1700/OHS-1700

R&D AND MANUFACTURING

- Wide selection of power meter options, to better fulfill specific requirements
- 1, 2 or 4 detectors on a single module
- Two optical head models–the Ultra-High-Power™ (40 dBm) model, and the wide-area, low-PDR (± 0.005 dB) model
- Interface module for controlling 1 or 2 different optical heads
- Continuous sampling rate of up to 5 kHz

Get Fast, High-Performance Power Meter Measurements

Introducing the IQS-1600/IQS-1700/OHS-1700 Power Meter and Optical Head Series, EXFO's modular answer to all your power measurement requirements. Designed for the IQS-500 Intelligent Test System, these power meters deliver speed, accuracy and flexibility in a platform-based solution.

Easy-to-Use Interface

The flexible graphical user interface (GUI) developed by EXFO allows easy control of the power meter settings. Get instant access to software buttons, such as those used to launch an acquisition, perform a min/max signal tracking or activate the Graph mode.

Graph Mode
The Graph mode provides user-configurable measurement displays. Up to four curves can be displayed at once. When operating in Continuous mode, the graph displays the measurements in real time.

High-Speed Acquisition with an Extended Range

The IQS-1700's unique, patent-pending design saves time, cuts costs and significantly enhances throughput with its Continuous-mode peak-acquisition speed of 5208 acquisitions per second. Its 80 dB range and 300 µs stabilization time allows you to simultaneously measure high and low signals on up to two channels. Test more components with a single, small-footprint module, thanks to the IQS-1700 High-Performance Power Meter's two-channel capability.

Data Acquisition
Perform acquisitions on a single channel or on several channels simultaneously, and save all results in a file on the IQS platform or on your network. Triggers are available on IQS-1600 models.

Min/Max Function
This special data acquisition mode lets you track the minimum and maximum values measured on each channel over a defined timespan, allowing for the measurement of a component's PDL or a source's power drift over time.

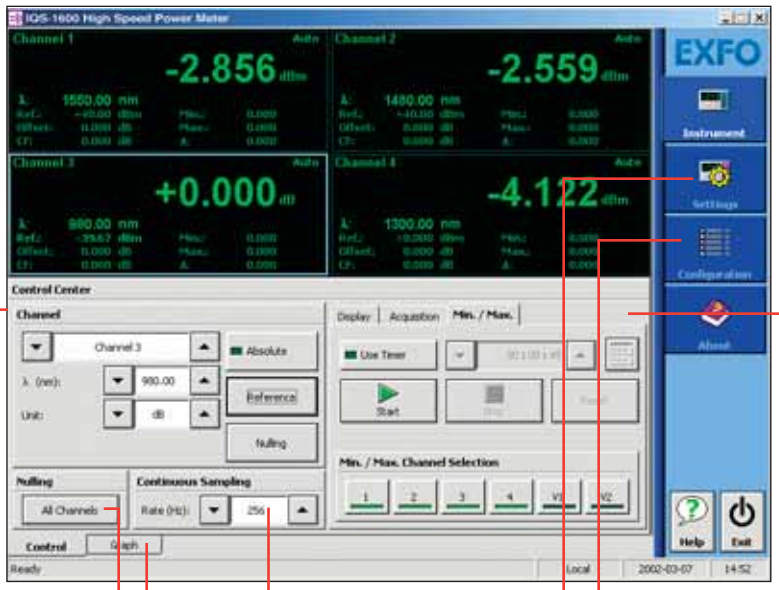
Virtual Channels
The power meter application offers one or two virtual channels, enabling real-time power ratio calculations and display. This is most useful when you need to actively reference an optical source that drifts over time, or to compare two channels with theoretically identical power.

The IQS-500 Intelligent Test System

The new IQS-500 Intelligent Test System provides a flexible approach to optical test and measurement for manufacturing, automation, optical qualification and R&D. It combines powerful features and control capabilities for up to 100 modules.

Based on standard industrial PC architecture, the IQS-500 Intelligent Test System is a scalable modular platform that includes controllers, expansion units and a comprehensive range of plug-in test modules. The IQS-500 is also backward-compatible with most of EXFO's IQ-generation modules, allowing you to maximize the return on previous investments. The IQS-500 Intelligent Test System offers a powerful, easy-to-use environment to match your most demanding needs.

Power Measurements: Display and Features



Channel
Define each channel's parameters: wavelength, power measurement unit, Absolute or Reference mode, and nulling from the control panel.

Nulling
Start your test session by performing nulling on all channels, and avoid the effects of electronic dark current.

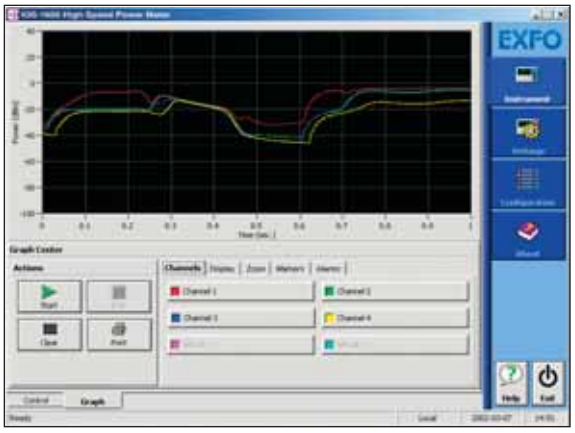
Graph
Choose the Graph mode and simultaneously display up to four channels while performing an acquisition.

Continuous Sampling
Select the required continuous sampling rate (up to 256 Hz with the IQS-1600, and up to 5208 Hz with the IQS-1700).

Display
Set the display characteristics, such as the number of channels and refresh rate. You can also select a virtual channel to be displayed. Launch a standard or min/max acquisition.

Configuration
Save your power-measurement settings, and ensure you are up and running in no time whenever you need to perform a test session.

Settings
Select your virtual channels, set the parameters for simultaneous multichannel testing, manage your list of most frequently used wavelengths, and set acquisition parameters.



The Graph mode offers unique real-time display of high-speed power-measurement results.

Advanced Detector Options

The IQS-1600: High-Performance Features

With the automatic gain range feature, power fluctuations of up to 95 dB stabilize within 15 ms, and a continuous sampling rate of up to 256 samples per second can be achieved. You can also manually select the gain range for individual channels. In this case, dynamic range is limited to the selection; but in return, stabilization times are shorter (as little as 1 ms), with sampling rates as high as 4096 samples per second.

The synchronization capability of the IQS-1600 High-Speed Power Meter complements the high sampling rates. This high-speed power meter provides two types of synchronization triggers, a power level trigger and a TTL voltage (electrical) trigger. For both, synchronization of all optical channels (2- and 4-channel models) is simultaneous.

The IQS-1600 comes with front panel InGaAs detectors, with an impressive –85 dBm sensitivity. The following options are available:

Wide Area Detector
Select the wide area detector for highly repeatable in-process testing of passive components long before they are connectorized. Combined with EXFO's line of bare fiber adapters, the IQS-1600W Power Meter enables accurate, efficient measurements over all telecom transmission bands.

Low-PDR Detector
A second detector option, specified for very low polarization-dependent response (IQS-1600 PL, with a PDR of ± 0.005 dB), provides better relative uncertainty. Even with highly polarized sources such as DFB or tunable lasers, minor variations in the test setup (patchcord movement or pinching) don't affect readings beyond specified values. For IL or very low PDL component measurements, this detector provides optimal accuracy.

Easy Fiber Handling

Use the BFA-3000 Universal Bare Fiber Adapter to perform measurements for unconnectorized components on the 3 mm detector of the IQS-1600W High-Speed Power Meter or OHS-1700 Optical Head. Select the FOA-3000 Adapter to connect the BFA-3000 to the power meter module.

The IQS-1700: Remote Power/High-Power Measurement

Power, simplicity and flexibility are what you get when you combine up to two OHS-1700 High-Performance Optical Heads with the IQS-1700 High-Performance Power Meter interface module. This patent-pending* combination allows you to move the power measurement sensor to the device under test (DUT) for efficient testing.

Such a design allows a Continuous-mode peak acquisition speed of 5208 samples/s over an 80 dB range, while maintaining a 300 µs stabilization time. Each optical head is individually calibrated, allowing you to interchange heads on a module or between test stations, without compromising on accuracy.

Choose from three sensing options that deliver performance exceeding even the most demanding R&D and manufacturing requirements:

- The OHS-1700W-PL* Optical Head, which offers a wide-area detector with low polarization-dependent response (± 0.005 dB), for optimized bare-fiber and high-PDL-device power measurements
- The OHS-1700-UH** Optical Head, which comes with an Ultra-High-Power™ detector, for safe power measurements of up to 40 dBm
- The IQS-1702X model, which uses GeX front panel detectors, enabling high-power measurements of up to 21 dBm

* Protected by US patent 6,621,067

** Protected by US patent 6,437,861

Remote Testing Made Easy

Ultra-High-Power capability

- Up to 40 dBm
- ± 4 % uncertainty (accuracy)
- First-class linearity

Wide-area, 3 mm InGaAs detector

- Detects 100 % of the signal–even from a bare fiber
- Low polarization-dependent response, delivering enhanced accuracy for every single measurement

SPECIFICATIONS [a] (IQS-1600 Series)

Model	IQS-1613/1623/1643	IQS-1613-PL/1623-PL/1643-PL	IQS-1613W/1623W/1643W
Number of detectors	1/2/4	1/2/4	1/2/4
Detector type	InGaAs	InGaAs	InGaAs
Detector size (mm)	1	1	3
Wavelength range (nm)	800 to 1700	800 to 1700	800 to 1700
Power range [b, j] (dBm)	9 to –85	9 to –85	8 to –75
Uncertainty [c] (%)	±5 (0 dBm to –55 dBm)	±5 (0 dBm to –55 dBm)	±5 (0 dBm to –50 dBm)
Polarization dependent responsivity [d] (dB)	N/A	±0.005	N/A
Linearity [e] (dB)	±0.015 (0 dBm to –55 dBm)	±0.015 (0 dBm to –55 dBm)	±0.015 (0 dBm to –50 dBm)
Power resolution (dB)	0.001 (9 dBm to –40 dBm)	0.001 (9 dBm to –40 dBm)	0.001 (8 dBm to –40 dBm)
Wavelength resolution (nm)	0.01	0.01	0.01
Stabilization time (ms)			
automatic range	< 12 (9 dBm to –85 dBm)	< 12 (9 dBm to –85 dBm)	< 6 (8 dBm to –75 dBm)
automatic range	< 3 (9 dBm to –50 dBm)	< 3 (9 dBm to –50 dBm)	< 3 (8 dBm to –49 dBm)
fixed range (ranges 1 to 4)	< 1	< 1	< 1
Sampling rate (sample/s/channel)			
fast acquisition mode	up to 4096	up to 4096	up to 4096
continuous measurement mode	up to 256	up to 256	up to 256
Fiber type (µm)	5/125 to 62.5/125	5/125 to 62.5/125	5/125 to 62.5/125

SPECIFICATIONS [f] (IQS-/OHS-1700 Series)

All optical heads must be operated with the IQS-1710/1720 High-Performance Interface Module.

Model	IQS-1712X/1722X	OHS-1713W-PL	OHS-1713-UH
Number of detectors	1/2	1	1
Detector type	GeX	InGaAs	InGaAs & integrating cavity
Detector size	2 mm detector	3 mm detector	9 mm input aperture
Wavelength range (nm)	800 to 1660	800 to 1700	930 to 1660
Power range [b,j] (dBm)	21 to –53	8 to –78	40 to –53
Uncertainty	±(5 % + 5 nW) [g,j]	±(5 % + 10 pW) [h,j]	±(4 % + 5 nW) [i,j]
Polarization-dependent responsivity [d] (dB)	N/A	±0.005 max.	±0.008 typ.
Linearity [e]	±0.015 dB (10 dBm to –30 dBm)	±0.015 dB ± 10 pW (0 dBm to –50 dBm)	±0.11 dB (37 dBm to 30 dBm) ±0.05 dB (30 dBm to 0 dBm) ±0.015 dB ± 5 nW (≤ 0 dBm)
Power resolution [j] (dB)	0.001 (21 dBm to –24 dBm)	0.001 (8 dBm to –44 dBm)	0.001 (40 dBm to –17 dBm)
Wavelength resolution (nm)	0.01	0.01	0.01
Stabilization time (ms)	0.3	0.3	0.3
Sampling rate (sample/s/channel)	up to 5208	up to 5208	up to 5208
Fiber type (µm)	5/125 to 62.5/125 NA ≤ 0.3	5/125 to 62.5/125 NA ≤ 0.3	5/125 to 62.5/125 NA ≤ 0.4 (with BFA-3000)

Notes to Specifications

a. At 1310 nm (unless otherwise specified), with an FC non-angled connector and a warmup time of 20 minutes, followed by an offset nulling.
b. From 18 °C to 28 °C.
c. At 23 °C ± 1 °C with an FOA-322, between 1000 nm and 1640 nm. For IQS-16X3 and IQS-16X3W, add 1 % to uncertainty below 1000 nm, and 6 % over 1640 nm. For IQS-16X3-PL, add 2 % to uncertainty below 1000 nm, and 6 % over 1640 nm.
d. At 23 °C ± 3 °C, constant wavelength (1550 nm), constant power and with an FC non-angled connector.
e. At constant temperature in the 0 °C to 40 °C range; nulling required.
f. At 1550 nm (unless otherwise specified), with an FC angled connector and a warmup time of 20 minutes, followed by an offset nulling.
g. At 23 °C ± 1 °C with an FOA-322, between 1000 nm and 1650 nm. Add 1 % to uncertainty below 1000 nm, and 3 % over 1650 nm.
h. At 23 °C ± 1 °C with an FOA-322, between 1000 nm and 1640 nm. Add 1 % to uncertainty below 1000 nm, and 6 % over 1640 nm.
i. At 23 °C ± 1 °C with an FOA-322 and a FC angled connector, between 1290 nm and 1340 nm, and between 1420 nm and 1640 nm. Add 2 % to uncertainty below 1000 nm, 1 % between 1370 nm and 1420 nm, and 5 % over 1640 nm. Includes all interference effects on the detector. All uncertainties valid on the day of calibration. Wavelength must not be equal to any water absorption line.
j. Averaging time of 1 s.

GENERAL SPECIFICATIONS

	IQS-1613/1623/1643	IQS-1613W/1623W/1643W	IQS-1710/1720 and IQS-1712X/1722X	OHS-1713W-PL	OHS-1713-UH
External trigger input voltage (V)	0 to 5 (TTL)	0 to 5 (TTL)	N/A	N/A	N/A
Size (H x W x D)	125 mm x 36 mm x 282 mm ($4^{15}/_{16}$ in x $1^{7}/_{16}$ in x $11^{1}/_{8}$ in)	125 mm x 36 mm x 282 mm ($4^{15}/_{16}$ in x $1^{7}/_{16}$ in x $11^{1}/_{8}$ in)	125 mm x 36 mm x 282 mm ($4^{15}/_{16}$ in x $1^{7}/_{16}$ in x $11^{1}/_{8}$ in)	43 mm x 66 mm x 151 mm ($1^{11}/_{16}$ in x $2^{5}/_{8}$ in x $5^{15}/_{16}$ in)	42 mm x 79 mm x 190 mm ($1^{5}/_{8}$ in x $3^{1}/_{8}$ in x $7^{1}/_{2}$ in)
Weight	0.7 kg (1.5 lb)	0.7 kg (1.5 lb)	0.58 kg (1.3 lb)	0.32 kg (0.7 lb)	0.45 kg (1.0 lb)
Temperature					
Operating [a]	0 °C to 40 °C (32 °F to 104 °F)	0 °C to 40 °C (32 °F to 104 °F)	0 °C to 40 °C (32 °F to 104 °F)	0 °C to 40 °C (32 °F to 104 °F)	0 °C to 40 °C (32 °F to 104 °F)
Storage	–35 °C to 70 °C (–31 °F to 158 °F)	–35 °C to 70 °C (–31 °F to 158 °F)	–40 °C to 70 °C (–40 °F to 158 °F)	–40 °C to 70 °C (–40 °F to 158 °F)	–40 °C to 70 °C (–40 °F to 158 °F)
Analog output Bandwidth (Hz)	700 k; 700 k; 30 k; 30 k 150; 150; (typical) [b]	50 k, 7.5 k, 5 k 7 k, 1 k, 1 k (typical) [b]	2500 (typical)	N/A	N/A
Output voltage (V)	0 to 2.15 (typical)	0 to 2.15 (typical)	0 to 4 (typical)	N/A	N/A
Output impedance (Ω)	640	640	100 to 150	N/A	N/A
Number of ports	1/1/0	1/1/0	1/2/1	N/A	N/A
Relative humidity [c]	0 % to 80 % non-condensing	0 % to 80 % non-condensing	0 % to 80 % non-condensing	0 % to 80 % non-condensing	0 % to 80 % non-condensing

Notes to General Specifications

a. For optical power of > 35 dBm, maximum operating temperature is 30 °C. With the FOA-396, maximum operating temperature is 25 °C.

b. Bandwidth corresponds to each of the six electric scales, ranging from the lowest to the highest gain.

c. From 0 °C to 40 °C.

N/A: not available.

REMOTE CONTROL

With IQS-500: GPIB (IEEE-488.1, IEEE-488.2), Ethernet and RS-232.

INSTRUMENT DRIVERS

LabVIEW™, SCPI commands and COM/DCOM library drivers.

STANDARD ACCESSORIES

User guide, one fiber-optic adapter per channel, Certificate of Compliance and Certificate of Calibration.

ORDERING INFORMATION

Power meter module

IQS-16XX-FOA-XX

Number of channels
1 = One channel
2 = Two channels
4 = Four channels

Detector
3 = InGaAs detector
3W = 3 mm InGaAs detector
3-PL = InGaAs low polarization-dependent response (PDR) detector

Example: IQS-1623-PL-FOA-322

Power meter module

IQS-17XX-FOA-XX

Model
IQS-1712X = Single-channel, high-power Ge detector, up to 21 dBm
IQS-1722X = Dual-channel, high-power Ge detector, up to 21 dBm

Example: IQS-1722X-FOA-322

Optical head

OHS-17XX-FOA-XX-XM

Model
OHS-1713-UH = Ultra-High-Power™ InGaAs detector, 9 mm input aperture
OHS-1713W-PL = 3 mm InGaAs low polarization-dependent response (PDR) detector

Cable
1M = 1 m interface cable (std)
2M = 2 m interface cable

Example: OHS-1713W-PL-FOA-322-2M

Interface module for remote heads

IQS-17XX

Model
IQS-1710 = Single-channel optical head interface
IQS-1720 = Dual-channel, optical head interface

Example: IQS-1720

Connector adapter
FOA-316 = SMA 906 ultra-low-reflection
FOA-322 = FC ultra-low-reflection: FC (PC/SPC/UPC/APC), NEC-D3
FOA-328 = DIN 47256 (LSA) ultra-low-reflection: DIN 47256 (PC/APC)
FOA-332 = ST ultra-low-reflection: ST (PC/SPC/UPC)
FOA-340 = Diamond HMS-0, HFS-3 (3.5 mm) ultra-low-reflection
FOA-354 = SC ultra-low-reflection: SC (PC/SPC/UPC/APC)
FOA-376 = FSMA HMS-10/AG, HFS-10/AG ultra-low-reflection
FOA-384 = Diamond HMS-10, HFS-13 ultra-low-reflection
FOA-392[a] = MTP ultra-low-reflection
FOA-393[a] = MT-RJ ultra-low-reflection
FOA-396 = E-2000 ultra-low-reflection (PC/APC)
FOA-397 = LX.5 ultra-low-reflection
FOA-398 = LC ultra-low-reflection
FOA-399 = MU ultra-low-reflection
FOA-3000 = Adapter for BFA-3000
FOA-8100 = BFA adapter

Optional Accessories

BFA-3000 = Universal Bare Fiber Adapter, to be used with FOA-8100
GP-3010 = 1 m interface cable[b]
GP-3011 = 2 m interface cable[b]

Notes
a. Available for IQS-16X3W and OHS-1700 only.
b. For OHS-171X only.

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SP|QS1600/1700/OHS1700.5AN

Printed in Canada 06/03

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