AQ6370 Series
Optical Spectrum Analyzer

AQ6370C / AQ6373 / AQ6375

VIS to NIR Applications
High resolution & dynamic range
Fast measurement
GP-IB/ Ethernet remote control
USB

QUALITY ■ INNOVATION ■ FORESIGHT

For more information go to
tmi.yokogawa.com
Test & Measurement Instruments

Bulletin AQ6370SR-10EN
High Performance Optical Spectrum Analyzers
Meeting Measurement Needs in a Broad Range of Applications

Wide Wavelength Coverage

**AQ6370C (600 to 1700 nm)**
Standard model optimized to the wavelengths often used in telecommunication applications.

**AQ6373 (350 to 1200 nm)**
for short-wavelength including visible light (VIS). This VIS is from 380 to 780 nm.

**AQ6375 (1200 to 2400 nm)**
for long-wavelength over 2 µm.

**World-class Optical Performance**

**High Resolution 0.02 nm**
& **High Dynamic Range 78 dB**

The advanced monochromator achieves high wavelength resolution and high close-in dynamic range. With the sharper spectral characteristics of the monochromator, spectral signals in close proximity can be separated clearly and measured accurately.

**High Sensitivity: -90 dBm**

Weak optical signals can be measured accurately and quickly.

**7 sensitivity settings**
Can be selected according to test applications and measurement speed requirements. The settings correspond to the sensitivity from -60 dBm to -90 dBm in approximate 5 dB steps, in the case of AQ6370C.

**High dynamic mode**
Obtains a better dynamic range by reducing the influence of stray-light, which is caused when the input is a strong optical signal.

**Pulsed Light Measurement**

- Peak-Hold and External trigger mode
- Measure a pulse peak spectrum of a pulsed light signal. Often used in the transmission loop testing of telecommunication systems, and also in the low power measurement at the early stage of laser chip development to catch the peak power of a pulsed signal.

**Free Space Input**

- Multimode and single mode fiber on the same OSA
- AQ6370 series’ low insertion loss for multimode fiber is also beneficial to maintain the excellent measurement efficiency.
- Small insertion loss variation at the input connector increases measurement repeatability.
- No damage connecting fibers because there is no physical contact.

**Optical Alignment Function**

Automatically aligns the optical path in the monochromator using the built-in source to maintain high performance.

**Wavelength Calibration Function**

Automatically calibrates the spectrum analyzer with the built-in wavelength reference or an external light source, to ensure the wavelength accuracy.

- There are cases that the optical alignment and wavelength calibration function cannot correct optical performance. Periodical calibration is also required separately.

**Excellent Efficiency**

**Fast Sweep**

With an advanced monochromator, faster electrical circuits, and noise reduction techniques, the AQ6370 series achieves fast measurement speed even when measuring a steep spectrum from DFB-LD or DWDM signals, or when measuring a low power signal from a broadband light source.

**Fast Remote Interface**

AQ6370 series provides faster remote control and data transfer capability.

- Ethernet interface is 100 times faster
- GP-IB interface is 10 times faster

**Wide Span Sweep yet High Resolution**

The 50,001 data sampling points expands measurement range in a single sweep while keeping a high wavelength resolution. This makes your measurement easier and more efficient than conventional systems that use a low number of sampling points and require multiple partial measurements to cover the complete wavelength range.

**Easy to Keep Accurate**

Ambient condition change, vibration and shock to an optical precision product, like an optical spectrum analyzer, will effect the optical components, and eventually degrade optical performance. Using standard functions, AQ6370 series can maintain its high optical performance within a couple of minutes so that you can quickly start a measurement.

**Built-in Calibration Source**

Wavelength reference source

- Available on AQ6370C and AQ6375

**Optical alignment source**

- Available on AQ6373

**Note.** There are cases that the optical alignment and wavelength calibration function cannot correct optical performance. Periodical calibration is also required separately.

* Those numbers are for AQ6370C, and the dynamic range is a typical value.
Various Features for Establishing Comfortable Test Environment

**Easy Operation**

- **Trace zooming**
  - Change display conditions, such as center wavelength and span, by clicking and dragging the mouse.
  - Enlarge your area of interest instantly and move it at will.
  - No need for another measurement to modify the display conditions.

- **Mouse & Keyboard operation**
  - Front panel operation proven intuitive and easy to use by our many of users.
  - Even easier with a mouse.
  - The keyboard helps enter labels and file names.

- **7 individual traces**
  - Simultaneous multi-trace display
  - Calculation between traces subtraction between traces
  - Max/Min hold

- **Spectrum analysis functions**
  - 13+ data analysis functions for popular applications
  - Built-in analysis functions:
    - Spectral width analysis
    - WDM (GSM) analysis
    - WDM-MF (EDFA) analysis
    - DFB-LD analysis
    - FP-LD analysis
    - LED analysis
    - SMSR analysis
    - Optical power analysis

**Easy Data Handling**

- **USB ports**
  - Four ports in total available on front and rear panels.

- **USB storage**
  - Support large size removable memory devices such as Flash ROM and hard disk drives (HDD).
  - Easy way to carry a large number of data files.

- **512 MB internal storage**
  - Save over 20,000 data files

  - File types and formats:
    - Trace: Binary and ASCII (CSV)
    - Graphical: BMP and TIFF
    - Analysis results: Binary and ASCII (CSV)
    - Template: ASCII (CSV)
    - System setup: Binary
    - Macro program: Binary

**Trace Calculation and Analysis**

- **Macro programming**
  - Build a simple auto-measurement system
  - No external IC is required.
  - Easy to create test program by recording the user’s actual key strokes and parameter selections.
  - Can control external equipment through the remote interfaces.

- **Fast remote interfaces**
  - GP-IB, RS-232, and Ethernet (10/100Base-T) Interfaces
  - Easy to connect with an external IC and to build an automated test system.
  - Improve the testing throughput of test systems by the fast measurement, control processing, and data transfer speed.

- **SCPI compatible**
  - The standard remote commands are compatible with SCPI, which is an ASCII test based standard code and format that conforms to IEEE 488.2.

- **AQ6317 emulation Mode**
  - Supports the prevalent remote command set of Yokogawa's best-seller AQ6317 series and AQ6315 for users to easily upgrade from their current automated test environment.
  - Also some commands may not be compatible due to changes in specifications and features.

- **LabVIEW® driver available**
Key Features

AQ6370C 600 to 1700 nm

- Standard and High-performance models
  - There are two models available: Standard and High performance. The High performance model provides even higher wavelength accuracy and dynamic range.

- High wavelength resolution: 0.02 nm
  - High performance model: ±0.01 nm
  - Standard model: ±0.02 nm (C-L band)

- Ultra-High dynamic range: 78 dB typ.
  - With the reduced stray-light in the monochromator, AQ6370C achieves ultra-high dynamic range of typ. 78 dB.

- Sharper filter edge
  - The high performance model can also achieve a higher dynamic range within 0.2 nm of the peak wavelength. With the sharper spectral characteristics of the monochromator, spectral signals in close proximity can be separated clearly and measured accurately.

Example of the spectral shape

Stray-light suppression ratio: 80 dB typ.

This new specification provides stray-light suppression capability without the high dynamic mode, which takes a longer measurement time. The AQ6370C contributes to shortening the measurement time with the high stray-light suppression ratio.

Example of the stray-light suppression ratio

Wide level range: ±20 dBm to ±90 dBm

The AQ6370C can measure high power sources such as optical amplifiers and pump lasers for Raman amplifiers, and very weak optical signals as well. Measurement sensitivity can be chosen from seven categories according to test applications and measurement speed requirements.

- Improved level sensitivity: ±85 dBm
- Smoothing function
  - Reduce noise on the measured spectrum.
- APC level correction
  - The APC level correction function corrects the level offset caused by an insertion loss of angled PC connector.

Fast measurement: 0.2 sec. (100 nm span)

- Single-mode and Multimode fibers
- Built-in wavelength reference source for wavelength calibration and optical alignment
- Universal optical connectors

Optimized performance and functions for WDM systems

- High wavelength linearity and Level flatness (1450 to 1620 nm)
- WDM (OSNR) analysis and EDFA analysis

Applications

- Optical active devices
  - Laser diode/Filter laser/Optical amplifier/Optical transmission
- Optical passive devices
  - Fiber/EDFA/Specialty optical fiber
- Optical transmission equipment (DWDM, CWDM)
- Development support of Applied photonics equipment

AQ6373 350 to 1200 nm

- Wavelength accuracy: ±0.05 nm
- Wavelength resolution: 0.02 to 10 nm and 0.01 nm (400 to 470 nm)
- Max safe input power: ±20 dBm
- Level sensitivity: -80 dBm
- Dynamic range: ±60 dB
- Single-mode, Multimode, and Large-core fibers
- Built-in optical alignment source
- Wavelength calibration with an external reference source

Various analysis functions including the Color analysis function for Visible light

Applications

- Optical active devices (Laser diode/Filter laser)
- Optical passive devices (Filter/EDFA/Specialty optical fiber)
- Development support of Applied photonics equipment

AQ6375 1200 to 2400 nm

- Wavelength accuracy: ±0.05 nm
- Wavelength resolution: 0.02 to 2 nm and 0.01 nm (400 to 470 nm)
- Max safe input power: ±20 dBm
- Level sensitivity: -70 dBm
- Dynamic range: ±55 dB
- Single-mode and Multimode fibers
- Built-in wavelength reference source for wavelength calibration and optical alignment
- Universal optical connectors
- Various analysis functions
- X-axis: nm / THz / cm⁻¹

Applications

- Optical active devices (Laser diode/Filter laser)
- Optical passive devices (Filter/EDFA/Specialty optical fiber)
- Development support of Applied photonics equipment

OSNR measurement on DWDM system

The WDM(OSNR) analysis function finds channel wavelength, power, channel spacing, and OSNR.

Example of the spectral shape

Example of the OSNR measurement:

AQ6370C

In 400-470 nm range, achieves even higher resolution.

AQ6373

White light source (red) and the background noise of AQ6375 (red) 
Resolution: 2 nm, Sensitivity: ±0.01 nm

AQ6375

- The details of oscillation modes can be measured with high accuracy of 0.01 nm (C band)
- OSNR measurement on DWDM system

The WDM(OSNR) analysis function finds channel wavelength, power, channel spacing, and OSNR.

Example of the spectral shape

Example of the OSNR measurement:

AQ6370C

In 400-470 nm range, achieves even higher resolution.

AQ6373

White light source (red) and the background noise of AQ6375 (red) 
Resolution: 2 nm, Sensitivity: ±0.01 nm

AQ6375

- The details of oscillation modes can be measured with high accuracy of 0.01 nm (C band)
- OSNR measurement on DWDM system

The WDM(OSNR) analysis function finds channel wavelength, power, channel spacing, and OSNR.
AQ6370C’s wide close-in dynamic range allows accurate OSNR measurement of OSMR transmission systems. The built-in WDM analysis function analyzes the measured waveform and shows peak wavelength, peak level and OSNR of WDM signals up to 1024 channels simultaneously. The curve fit function is used to accurately measure noise levels.

AQ6373

Accessories (Optional)

AQ6370 Viewer (PC application software)

The AQ6370 Viewer is a package of PC application software for the AQ6370 series Optical Spectrum Analyzer.

- The same user interface and functions as the mainframe
- Display and analyze waveform data acquired by the mainframe
- Remote control and file transfer capability

Viewer function

Trace data files saved on the AQ6370 series can be retrieved and analyzed on a PC.

Note. Measurement cannot be initiated in the viewer mode.

AQ6370BC Viewer connected to LAN

Remote control & File transfer

PC Requirements
- Harddisk: 30 MB or more of available disk space, Memory: 512 MB or more
- OS: Windows 2000 (Service Pack 4 or later) or Windows XP (Service Pack 1 or later)

Bundled software
- AQ6370 Viewer consists of the following software.
- AQ6370C Viewer: AQ6370C Optical Spectrum Analyzer
- AQ6373 Viewer: AQ6373 Optical Spectrum Analyzer
- AQ6375 Viewer: AQ6375 Optical Spectrum Analyzer
- AQ6370B Viewer: AQ6370B Optical Spectrum Analyzer

Related Products

White Light Source AQ4305

The AQ4305 is a high power and broadband light source using a halogen lamp. In conjunction with the AQ6370 series optical spectrum analyzer, the AQ4305 allows to measure the wavelength dependent loss characteristics of optical devices and optical fibers at wavelengths used for such applications as telecommunications, visible light, and environmental measurement.

- High power: 40 dBm or more (at GI50/125 µm)
- Wavelength range: 400 to 1800 nm
- High output stability: ±0.05 dB
- Optical output: Free space

Multi Application Test System AQ2200

The AQ2200 Multi Application Test System is the ideal system for building a measuring system in conjunction with the AQ6370 series for a wide range of optical devices and optical transmission systems. The AQ2200B is available in two different frame controller platforms and offers a variety of measurement modules to build a custom, yet flexible test system.

- Frame controllers: 3-slot model, 9-slot model
- Light source: DFB-LD
- Sensors: High sensitivity model, High power model, Dual model, Large diameter model
- Optical attenuators: Simple ATTN, ATTN with monitor port, ATTN with built-in sensor
- Optical switches: Dual 1:2, Dual 2:2, 1:4, 1:8, 1:16
- Optical transceiver controllers

Note. Modules for multimode fiber are also available for the optical attenuators and optical switches.
Major Specifications

AQ6370C

<table>
<thead>
<tr>
<th>Specification</th>
<th>Standard</th>
<th>High performance</th>
</tr>
</thead>
<tbody>
<tr>
<td>Wavelength range</td>
<td>192 nm to 1670 nm</td>
<td></td>
</tr>
<tr>
<td>Wavelength accuracy</td>
<td>±0.05 nm (1520 to 1580 nm), ±0.02 nm (1580 to 1620 nm)</td>
<td></td>
</tr>
<tr>
<td>Wavelength resolution</td>
<td>±0.2 nm (400 to 1100 nm)</td>
<td></td>
</tr>
<tr>
<td>Number of sampling position</td>
<td>101 to LED, AUTO</td>
<td></td>
</tr>
<tr>
<td>Level sensitivity setting</td>
<td>NORM, HOLD, NORM, AUTO, NORMAL, MD, HIGH1, MD, MID, HIGH2, HIGH3</td>
<td></td>
</tr>
<tr>
<td>High dynamic mode</td>
<td>SWITCH (Sensitivity, MD, HIGH1)</td>
<td></td>
</tr>
<tr>
<td>Level sensitivity</td>
<td>±0.20 dB (400 to 1100 nm), ±0.10 dB (Full range)</td>
<td></td>
</tr>
<tr>
<td>Level accuracy</td>
<td>±0.10 dB (Full range)</td>
<td></td>
</tr>
<tr>
<td>Warm-up time</td>
<td>Minimum 1 hour (After warming up, optical alignment adjustment with built-in light source is required.)</td>
<td></td>
</tr>
<tr>
<td>Optical connector</td>
<td>Optical input: 9.5/125 µm, NA: 0.104 to 0.107</td>
<td></td>
</tr>
<tr>
<td>Optical input:</td>
<td>9.5/125 µm, NA: 0.104 to 0.107</td>
<td></td>
</tr>
<tr>
<td>Mass</td>
<td>AQ6370C: 19 kg, AQ6373: 20 kg, AQ6375: 27 kg</td>
<td></td>
</tr>
<tr>
<td>Measurement mode</td>
<td>CW light, Pulsed light, External trigger, Air/vacuum wavelength, TLS synchronized sweep (excl. AQ6373)</td>
<td></td>
</tr>
<tr>
<td>Remote control</td>
<td>GP-IB, RS-232, Ethernet (TCP/IP)</td>
<td></td>
</tr>
<tr>
<td>Marker &amp; Search</td>
<td>Marker Delta markers (Max. 1024), Vertical/horizontal line markers</td>
<td></td>
</tr>
<tr>
<td>Optical fiber</td>
<td>SM, MM, 50/125 µm, 62.5/125 µm, 9.5/125 µm, 1.25/225 µm, 62.5/225 µm</td>
<td></td>
</tr>
<tr>
<td>Stray-light suppression ratio</td>
<td>73 dB, 76 dB (Typ. 80 dB)</td>
<td></td>
</tr>
<tr>
<td>Display</td>
<td>28 cm (W) x 21 cm (H) x 10 cm (D) mm</td>
<td></td>
</tr>
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<td>Mass</td>
<td>AQ6370C: 19 kg, AQ6373: 20 kg, AQ6375: 27 kg</td>
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</table>

General Specifications

Electrical Interface
- AC 100 to 240 V (50/60 Hz)
- USB, GPIB Interface (GPIB protocol: IEC 61869-5, IEC 61869-4)
- Ethernet (TCP/IP)

Dimensions
- Width: 260 mm, Height: 300 mm, Depth: 180 mm
-Weight: 19 kg

Other functions
- Optical analysis
  - Optical analysis with built-in light source
- Wavelength calibration
  - Wavelength calibration with an external reference source (AQ6370C & AQ6375 only) or an external reference source. AQ6370C needs an external reference source for wavelength calibration.
### Ordering Information

#### AQ6370C

<table>
<thead>
<tr>
<th>Model</th>
<th>Suffix</th>
<th>Descriptions</th>
</tr>
</thead>
<tbody>
<tr>
<td>AQ6370C</td>
<td></td>
<td>AQ6370C Optical Spectrum Analyzer</td>
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</table>

#### AQ6373

<table>
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<th>Model</th>
<th>Suffix</th>
<th>Descriptions</th>
</tr>
</thead>
<tbody>
<tr>
<td>AQ6373</td>
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<td>AQ6373 Optical Spectrum Analyzer</td>
</tr>
</tbody>
</table>

#### AQ6375

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<thead>
<tr>
<th>Model</th>
<th>Suffix</th>
<th>Descriptions</th>
</tr>
</thead>
<tbody>
<tr>
<td>AQ6375</td>
<td></td>
<td>AQ6375 Optical Spectrum Analyzer</td>
</tr>
</tbody>
</table>

### Models and Suffix Codes

#### Factory Installed Options

**Built-in Printer**
- An optional built-in thermal printer is provided to instantly print out a screenshot of the display, the analysis results, a marker list and a macro program list.
- Accessory: printer roll paper (1 roll)

**Optical Connector Adapters (AQ6370C & AQ6375)**
- For optical input port
  - AQ9447 Connector Adapter /FC, /SC, /ST
- For calibration output port
  - AQ9441 Universal Adapter /FC, /SC, /ST

### Accessories (optional)

<table>
<thead>
<tr>
<th>Model</th>
<th>Suffix code</th>
<th>Specifications</th>
</tr>
</thead>
<tbody>
<tr>
<td>735371</td>
<td></td>
<td>AQ6370 Viewer (including AQ6370, AQ6370B, AQ6370C, AQ6375, and AQ6373 Viewers)</td>
</tr>
<tr>
<td>810804602</td>
<td></td>
<td>AQ9447 Connector Adapter</td>
</tr>
<tr>
<td>813917321</td>
<td></td>
<td>AQ9441 Universal Adapter</td>
</tr>
<tr>
<td>735983-A001</td>
<td></td>
<td>NA Conversion Adapter (for 50/125 µm)</td>
</tr>
<tr>
<td>75153S-ES</td>
<td></td>
<td>19 inch Rack mount kit</td>
</tr>
<tr>
<td>89980A</td>
<td></td>
<td>Printer roll paper (10 m roll, 10 rolls/1 unit)</td>
</tr>
</tbody>
</table>

### Model Suffi x Descriptions

- **AQ6370C**
  - Spec code: -10 Standard model
  - Power cord:
    - O: UL/CSA standard
    - F: VDE standard
    - R: AS standard
    - H: GB standard
    - Q: BS standard
  - Factory installed options:
    - /FC AQ9447(FC) Connector Adapter
      - For Optical Input
    - /SC AQ9447(SC) Connector Adapter
    - /ST AQ9447(ST) Connector Adapter
    - /RF AQ9441(FC) Universal Adapter
      - For Calibration Output
    - /RS AQ9441(SC) Universal Adapter
    - /RU AQ9441(ST) Universal Adapter
    - /RS5 Thermal Printer

- **AQ6373**
  - Spec code: -10 Standard model
  - Power cord:
    - O: UL/CSA standard
    - F: VDE standard
    - R: AS standard
    - H: GB standard
    - Q: BS standard
  - Factory installed options:
    - /FC AQ9447(FC) Connector Adapter
      - For Optical Input
    - /SC AQ9447(SC) Connector Adapter
    - /ST AQ9447(ST) Connector Adapter
    - /RF AQ9441(FC) Universal Adapter
      - For Calibration Output
    - /RS AQ9441(SC) Universal Adapter
    - /RU AQ9441(ST) Universal Adapter
    - /RS5 Thermal Printer

- **AQ6375**
  - Spec code: -10 Standard model
  - Power cord:
    - O: UL/CSA standard
    - F: VDE standard
    - R: AS standard
    - H: GB standard
    - Q: BS standard
  - Factory installed options:
    - /FC AQ9447(FC) Connector Adapter
      - For Optical Input
    - /SC AQ9447(SC) Connector Adapter
    - /ST AQ9447(ST) Connector Adapter
    - /RF AQ9441(FC) Universal Adapter
      - For Calibration Output
    - /RS AQ9441(SC) Universal Adapter
    - /RU AQ9441(ST) Universal Adapter
    - /RS5 Thermal Printer

### Note

- Before operating the product, read the user’s manual thoroughly for proper and safe operation.
- If this product is for use with a system requiring safeguards that directly involve personnel safety, please contact the Yokogawa sales offices.

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