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2100

OPTICAL LIGHT SOURCE

IQS-2100/FLS-2100

R&D AND MANUFACTURING



- Single- or dual-wavelength LED or Fabry-Perot laser
- 10 dB variable output power
- Excellent stability
- Benchtop and modular instruments available

www.EXFO.com

Telecom Test and Measurement

EXFO

EXPERTISE REACHING OUT

High-Performance Optical Light Sources

Advanced testing environments require a high-performance, stable light source to guarantee accurate and reliable test results. The IQS-2100 and FLS-2100 offer this and more. Designed for optimal stability, choose the module or benchtop instrument. Steady drive circuitry maximizes optical output power and maintains excellent stability, while precision optical components ensure efficient low-loss, narrow-beam output coupling.

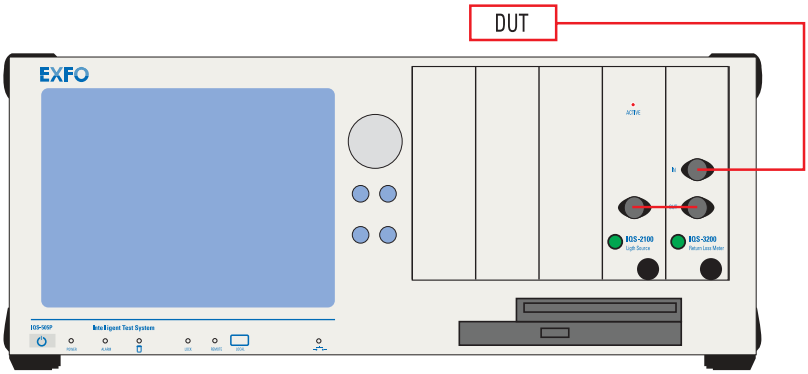


KEY FEATURES AND BENEFITS

- Variable output power over a 10 dB range (6 dB range for LED sources)
- Adjustable power increments of 0.1 dB
- Stabilized laser sources
- User-friendly software solutions

ORL Measurement

Reduce interference-related problems when measuring a device's ORL with EXFO's large linewidth Fabry-Perot laser, the IQS-2100 ORL Light Source. This source is available at 1310 nm, 1550 nm and 1625 nm for use in EXFO's modular IQS-500 platform. Combine one or many sources with the IQS-3200 Return Loss Meter to create a custom test station.





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 modules from EXFO's IQ generation, allowing you to maximize the return on your previous investments. The IQS-500 Intelligent Test System offers a powerful, easy-to-use environment to match your most demanding needs.



Simple, Flexible Software

- Store multiple-user configurations
- Run several applications simultaneously

Variable output power

- 10 dB power range variation (laser)
- 6 dB power range variation (LED)
- Fine-tuning of output power at 0.1 dB increments
- Simulation of small power losses

Choice of output signal

- Modulate the source
- Choose from three modulation frequencies: 270 Hz, 1 kHz and 2 kHz at 50 % duty cycle

Precise wavelength identification

- Save time when performing spectral tuning
- Fine-tune LED wavelength to the nearest 10 nm
- Adjust laser wavelength to the nearest 1 nm

Available Configurations

Multimode LED sources

- 850 nm LED
- 1300 nm LED
- 850/1300 nm dual LED

Temperature-controlled lasers

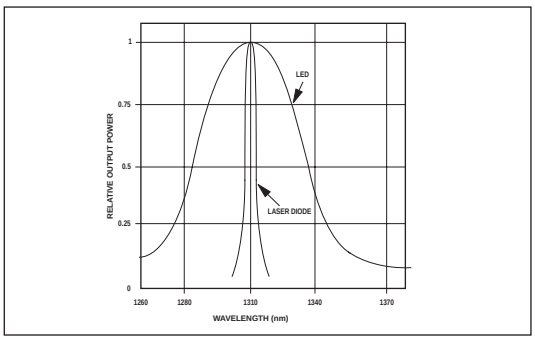
- 1310 nm Fabry-Perot laser
- 1550 nm Fabry-Perot laser
- 1625 nm Fabry-Perot laser
- 1310/1550 nm dual Fabry-Perot laser
- 1550/1625 nm dual Fabry-Perot laser
- 1310 nm Fabry-Perot laser (ORL)
- 1550 nm Fabry-Perot laser (ORL)
- 1625 nm Fabry-Perot laser (ORL)
- 1310/1550 nm dual Fabry-Perot laser (ORL)
- 1550/1625 nm dual Fabry-Perot laser (ORL)

Singlemode LED sources, polarized or non-polarized

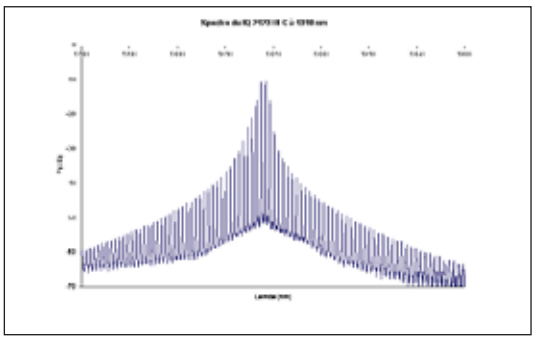
- 1550 nm LED
- 1310/1550 nm dual LED
- BP option includes a polarizer

Excellent stability

- ± 0.003 dB to ± 0.005 short-term stability (15 minutes)
- ± 0.03 dB to ± 0.05 long-term stability (8 hours)
- TEC lasers for guaranteed stability
- ORL sources include an optical isolator



The difference between LED and laser spectral widths



Typical Fabry-Perot spectral distribution

FLS-2100 Functionality

The FLS-2100 Optical Light Source features variable output power over a 10 dB range (6 dB range for LED sources) to simulate power losses with precision. Fine-tune this output power in precise increments of 0.1 dB. Fabry-Perot laser sources are stabilized by thermo-electric coolers that regulate the submount's internal temperature. Both LED and laser versions come in various wavelengths to fit all singlemode and multimode applications.



Remote-Control Capability

Enable remote operation of the FLS-2100 from any compatible PC or test station with standard GPIB, Ethernet and RS-232 interface. Use your computer to program software solutions for complex test procedures.

Universal Interface

Avoid high insertion loss, high return loss and measurement instability caused by dirty or contaminated connectors by using the Universal Interface. This patented universal connector gives you direct access to the ferrule, simplifying connector cleaning and ensuring better results. Designed to easily interchange from one connector type to another, the Universal Interface with fixed baseplate is available for PC, ultra-PC (UPC) and angled-PC (APC) connectors.



Rackmount

The FLS-2100 can be used as a stand-alone instrument or mounted on a 19-inch rack (optional).

Light Source Applications:

- Linearity measurements of variable attenuators and power meters
- Insertion loss measurements
- Return loss measurements
- Spectral attenuation measurements in fibers
- Instrument calibration
- Component characterization
- Splicing test stations
- Stability measurements
- Polarization-dependent loss measurements
- Polarization mode dispersion measurements

SPECIFICATIONS

TEC FABRY-PEROT LASER SPECIFICATIONS[a]

Model	02BLC	03BLC	04BLC	23BLC	34BLC
Wavelength[b] (nm)	1310 +20/–30	1550 ± 20	1625 ± 15	1310 +20/–30 1550 ± 20	1550 ± 20 1625 ± 15
Spectral width (rms)[c] (nm)	2	5	10	2/5	5/10
Output power (dBm)	≥ 0	≥ 0	≥ –4	≥ –1	≥ –4
Stability[d] (dB) (Δ/2)					
15 min	± 0.003	± 0.003	± 0.01	± 0.005	± 0.01
8 h	± 0.03	± 0.03	± 0.05	± 0.05	± 0.05
Temperature sensitivity[e] (dB)	± 0.25	± 0.25	± 0.25	± 0.25	± 0.25
Modulation		270 Hz, 1 kHz, 2 kHz (50 % duty cycle)			

Model	02ORL	03ORL	04ORL	23ORL	34ORL
Wavelength[b] (nm)	1310 +20/–30	1550 ± 20	1625 ± 15	1310 +20/–30 1550 ± 20	1550 ± 20 1625 ± 15
Spectral width (rms)[c] (nm)	2	5	10	2/5	5/10
Output power (dBm)	≥ –2	≥ –2	≥ –6	≥ –3	≥ –6
Stability[d] (dB) (Δ/2)					
15 min	± 0.01	± 0.01	± 0.01	± 0.01	± 0.01
8 h	± 0.03	± 0.03	± 0.03	± 0.05	± 0.03
Temperature sensitivity[e] (dB)	± 0.25	± 0.25	± 0.25	± 0.25	± 0.25

SURFACE-EMITTING LED SPECIFICATIONS[a]

Model	01C/D	02C/D	12C	12D
Wavelength[b] (nm)	850 ± 25	1300 +45/–60	850 ± 25 1300 +45/–60	850 ± 25 1300 +45/–60
Spectral width (FWHM)[f, g] (nm)	50	145	50/145	50/145
Output power (dBm)	≥ –17/≥ –14	≥ –21/≥ –17	≥ –18/–22	≥ –15/–18
Stability[d] (dB) (Δ/2)				
15 min	± 0.003	± 0.003	± 0.005	± 0.005
8 h	± 0.03	± 0.03	± 0.05	± 0.05
Temperature sensitivity[e] (dB)	± 0.4	± 0.4	± 0.4	± 0.4
Modulation		270 Hz, 1 kHz, 2 kHz (50 % duty cycle)		

EDGE-EMITTING LED SPECIFICATIONS[a]

	03BP	23BS/BP
Wavelength[b] (nm)	1550 +30/–40	1310 +30/–50 1550 +30/–40
Spectral width (FWHM)[f,g] (nm)	≥ 65	≥ 35/65
Output power (dBm)	≥ –20.5	BS ≥ –13.5/–18.5 BP ≥ –16/–21
Stability[d] (dB) (Δ/2)		
15 min	± 0.04	BS/BP ± 0.005/± 0.04
8 h	–	BS/BP ± 0.03/ –
Temperature sensitivity[e] (dB)	–	BS/BP ± 0.3/ –
Modulation	270 Hz, 1 kHz, 2 kHz (50 % duty cycle)	

Notes

a. All specifications are applicable to a 2 m fiber output (specified type) with FC/UPC (singlemode) and FC/PC (multimode) connectors, without any attenuation applied.

b. Valid over the operating temperature range.

c. rms = root mean square. Spectral width is a typical value.

d. Valid after a 1-hour warmup period at a constant temperature within the operating range. A 30-minute warmup period is needed if the module is stored beforehand at the same temperature. The stability is expressed as ± half the difference between the maximum and minimum values measured during the period.

e. For a temperature variation between 0 °C to 40 °C.

f. FWHM = full width at half maximum.

g. Typical value.

SPECIFICATIONS

GENERAL SPECIFICATIONS IQS-2100

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)
Weight	0.5 kg	(1.1 lb)
Temperature		
Operating	0 °C to 40 °C	(32 °F to 104 °F)
Storage	–35 °C to 70 °C	(–31 °F to 158 °F)
Relative humidity	0 % to 95 % non-condensing	

GENERAL SPECIFICATIONS FLS-2100

Size (H x W x D)	117 mm x 222 mm x 333 mm	(4 5/8 in x 8 3/4 in x 13 1/8 in)
Weight	1.2 kg	(2.6 lb)
Temperature		
Operating	0 °C to 40 °C	(32 °F to 104 °F)
Storage	–35 °C to 70 °C	(–31 °F to 158 °F)
Relative humidity	0 % to 80 % non-condensing	

INSTRUMENTS DRIVERS

LabVIEW™ drivers and SCPI commands

REMOTE CONTROL

With IQS-500: GPIB (IEEE-488.1, IEEE-488.2) Ethernet and RS-232.
With FLS-2100: GPIB (IEEE-488.1, IEEE-488.2) and RS-232.

SAFETY

21 CFR 1040.10, IEC 60825-1: Ed.1.1 1998:
CLASS 1 LASER PRODUCT
CLASS 1 LED PRODUCT

STANDARD ACCESSORIES

User Guide, Certificate of Compliance and AC power cord for FLS-2100

ORDERING INFORMATION

FLS-21XXXXX-XX
IQS-21XXXXX-XX

Platform type
IQS = module in IQS-500

Source code
01C = 850 nm LED
02C = 1300 nm LED
01D = 850 nm LED
02D = 1300 nm LED
12C = 850/1300 nm dual LED
12D = 850/1300 nm dual LED
02BLC = 1310 nm TEC laser
03BLC = 1550 nm TEC laser
04BLC = 1625 nm TEC laser
23BLC = 1310/1550 nm TEC laser
34BLC = 1550/1625 nm TEC laser
02ORL = 1310 nm TEC laser for ORL measurements
03ORL = 1550 nm TEC laser for ORL measurements
04ORL = 1625 nm TEC laser for ORL measurements
23ORL = 1310/1550 nm TEC laser for ORL measurements
34ORL = 1550/1625 nm TEC laser for ORL measurements
03BP = 1550 nm polarized LED singlemode
23BS = 1310/1550 nm dual LED singlemode
23BP = 1310/1550 nm dual-polarized LED singlemode

Connector or universal interface code
50 = FC/PC (multimode sources only)
58 = FC/APC narrow key
74 = ST/PC (multimode sources only)
89 = FC/UPC
90 = ST/UPC
EI-EUI-28 = UPC/DIN 47256
EI-EUI-76 = UPC/HMS-10/AG
EI-EUI-89 = UPC/FC narrow key
EI-EUI-90 = UPC/ST
EI-EUI-91 = UPC/SC
EI-EUI-95 = UPC/E-2000
EA-EUI-28 = APC/DIN 47256
EA-EUI-89 = APC/FC narrow key
EA-EUI-91 = APC/SC
EA-EUI-95 = APC/E-2000

Fiber code
B = 9/125 µm fiber
C = 50/125 µm fiber
D = 62.5/125 µm fiber

Example: FLS-2103BLC-EI-EUI-89
IQS-2103BLC-EI-EUI-89

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EXFO is certified ISO 9001 and attests to the quality of these products. This device complies with Part 15 of the FCC Rules. Operation is subject to the following two conditions: (1) this device may not cause harmful interference, and (2) this device must accept any interference received, including interference that may cause undesired operation. EXFO has made every effort to ensure that the information contained in this specification sheet is accurate. All of EXFO's manufactured products are compliant with the European Union's WEEE directive. For more information, please visit www.EXFO.com/recycle. However, we accept no responsibility for any errors or omissions, and we reserve the right to modify design, characteristics and products at any time without obligation. Units of measurement in this document conform to SI standards and practices.
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