IQS-2400

R&D AND MANUFACTURING–OPTICAL

- C- and L-band use
- +13 dBm output power
- ±0.01 nm accuracy
- Outstanding wavelength stability
- Ideal for EDFA testing

EXFO
EXPERTISE REACHING OUT

High-Accuracy WDM Laser Source

The IQS-2400 WDM Laser Source offers high accuracy and stability for testing the power and spectral sensitivity of active components, passive components and WDM building blocks.

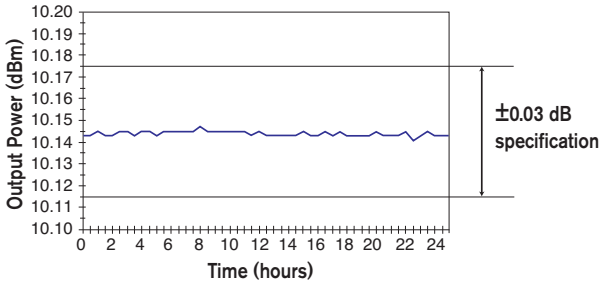
Unequaled long-term wavelength stability

The IQS-2400 emulates ITU-T channels in dense WDM applications such as multiwavelength network simulation, simultaneous multiple inputs for EDFA characterization and insertion loss measurement of DWDM passive components. This source is ideal for the production environment offering unmatched, long-term wavelength stability. The ±0.01 nm absolute accuracy enables the IQS-2400 WDM Laser Source to replace a wavelength measurement instrument when testing components or systems. The IQS-2400 features wavelength-tuning capabilities around each of the ITU-T grid wavelengths, dithering up to 300 kHz with a triangular or square waveform, and an output power reaching 13 dBm with a 10 dB attenuation range. DFB laser diode manufacturers have the option of providing their own DFBs.

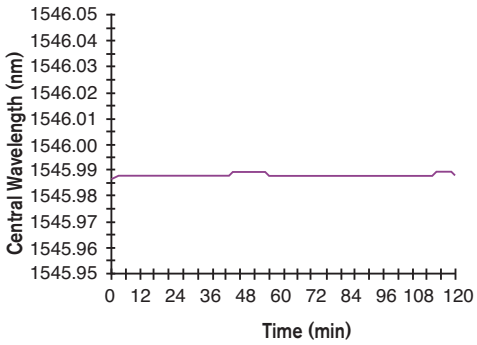
IQS-2400 WDM Laser Source

Multifunctional flexibility to match your needs

The IQS-2400 WDM Laser Source can operate in four different modes: Normal, High-Wavelength Stability, Dithering and On/Off. Normal mode provides access to total wavelength and power tuning ranges, maintaining full control of the output power (automatic power control). From a set point in wavelength and power levels, High-Wavelength Stability mode provides finer wavelength and power tuning resolutions through laser temperature steps of 0.01°C and laser current steps of 0.01 mA. This mode operates the laser at a constant current (automatic current control). Since the central wavelength may drift slightly (due to aging) in Normal mode, High-Wavelength Stability mode allows for continuous access to long-term, high-accuracy wavelength set points. The last two modes, On/Off and Dithering, provide modulation capabilities from 10 Hz to 300 kHz. On/Off mode ensures maximum optical extinction when activated, while Dithering mode adds a small waveform (triangular or square) to the CW signal, thus reducing the signal coherence length. In On/Off mode, several sources can be synchronized from an external TTL signal generator or from any module's synchronization output. Therefore, each source can operate at a different frequency and amplitude or precisely in phase.



The source's excellent power stability output is ideal for long-term monitoring.



The temperature stabilization circuit ensures low central wavelength drift.

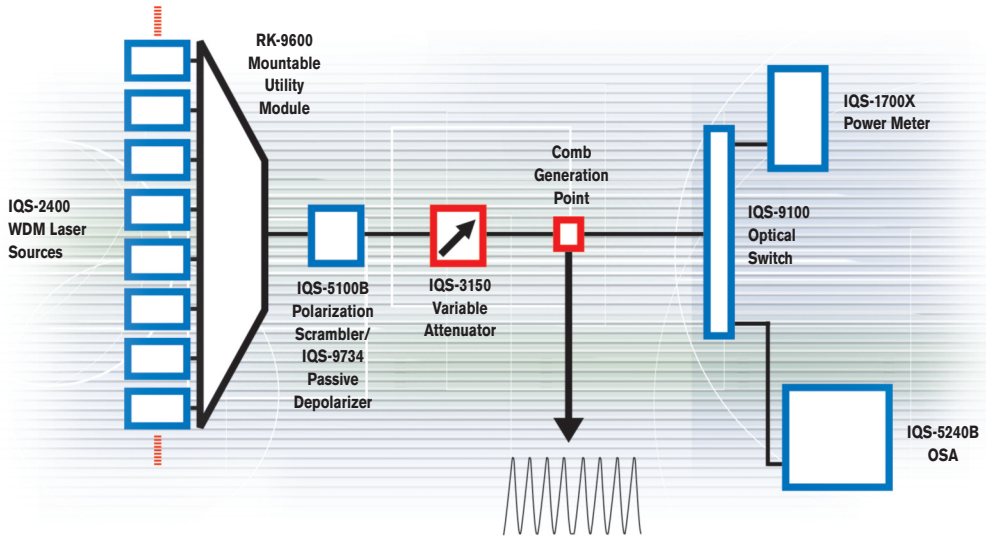
Precise calibration for outstanding performance

The power and wavelength of each DFB laser is accurately calibrated to ensure the best possible performance and confidence in your test results. The IQS-2400's calibration setup, using its NIST-traceable wavelength meter and four-channel power meter, allows fully referenced and automated calibration of the DFB's internal temperature and laser current. A precise central wavelength at any power level can be obtained. The ±0.01 nm absolute accuracy is one of the highest levels of accuracy available today for a laser source instrument.

Versatile and reliable EDFA and WDM testing

Combine more than one modular IQS-2400 WDM Laser Source with an IQS-3150-B Variable Attenuator or 3150-BI Variable Attenuator (with integrated power meter), an IQS-1700X Power Meter and an IQS-5240B Optical Spectrum Analyzer in an IQS-500 Intelligent Test System. This setup enables precise, stable tones at every attenuation step throughout the complete WDM spectrum. Automatic tone balancing avoids the time-consuming and tedious manual adjustments that were once necessary to obtain a uniform input comb.

Comb generation, control and feedback



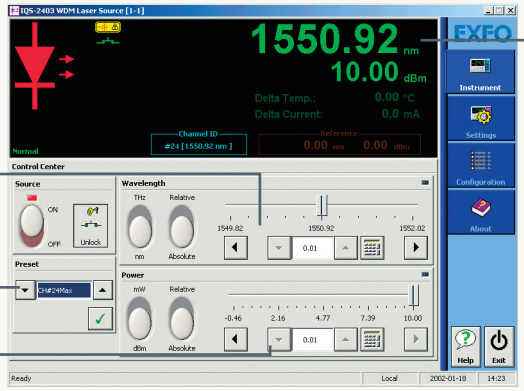
Typical setup for an IQS-based optical fiber amplifier test system using the IQS-2400 WDM Laser Source.

Main screen: IQS-2400 software application

A ±1 nm tuning range for complete optical loss/gain characterization around each ITU-T grid wavelength

Quick access to pre-selected set points

A 10 dB output power attenuation range



Indicator: user-defined set point for power and wavelength

The IQS-500 Intelligent Test System

The 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 previous investments. The IQS-500 Intelligent Test System offers a powerful, easy-to-use environment to match your most demanding needs.

Specifications

IQS-2402 SPECIFICATIONS

Model		P4
Wavelength band (nm)		1308 ± 5
Wavelength tuning range (nm)		±0.5 (typical)
Wavelength tuning resolution [b] (nm)		0.01
Wavelength accuracy [c, d] (nm)		±0.01
Wavelength stability [d, e] (nm)		±0.002
Output power [f] (dBm)		10
Output power attenuation range (dB)		>6
Spectral linewidth (MHz) (typical)		<20
Sidemode suppression [g] (dB)		30 (40 typical)
Output power uncertainty [c] (dB)		±0.3
Power stability [c, d] (dB)	15 min	±0.005 (Δ= 0.01)
	8 h	±0.03 (Δ= 0.06)
Modulation frequency (internal or external sync.) (kHz)		0.010 to 300
Dithered modulation amplitude range [h] (mA)		1 to 5
Dithered modulation electrical waveform		Square/triangular

IQS-2403 SPECIFICATIONS

Model		P4/P5	P6/P7
Wavelength band		C-band 1528 nm to 1565 nm	C-band 1528 nm to 1565 nm
Wavelength tuning range [a](nm)		±1	±1
Wavelength tuning resolution [b] (nm)		0.01	0.01
Wavelength accuracy [c, d] (nm)		±0.01	±0.02
Wavelength stability [d, e] (nm)		±0.002	±0.002
Output power [f] (dBm)		10	13
Spectral linewidth (MHz) (typical)		<20	<20
Output power attenuation range (dB)		10	10
Sidemode suppression [g] (dB)		30 (40 typical)	30 (40 typical)
Output power uncertainy [c] (dB)		±0.3	±0.3
Power stability [c, d] (dB)	15 min	±0.005 (Δ= 0.01)	±0.005 (Δ= 0.01)
	8 h	±0.03 (Δ= 0.06)	±0.03 (Δ= 0.06)
Modulation frequency (internal or external sync.) (kHz)		0.010 to 300	0.010 to 300
Dithered modulation amplitude range [h] (mA)		1 to 5	1 to 5
Dithered modulation electrical waveform		Square/triangular	Square/triangular

IQS-2404 SPECIFICATIONS

Model		P4/P5	P6/P7
Wavelength band		L-band 1566 nm to 1606 nm	L-band 1566 nm to 1606 nm
Wavelength tuning range [a] (nm)		±1	±1
Wavelength tuning resolution [b] (nm)		0.01	0.01
Wavelength accuracy [c, d] (nm)		±0.01	±0.02
Wavelength stability [d, e] (nm)		±0.002	±0.002
Output power [f] (dBm)		10	13
Output power attenuation range (dB)		10	10
Spectral linewidth (MHz) (typical)		<20	<20
Sidemode suppression [g] (dB)		30 (40 typical)	30 (40 typical)
Output power uncertainty [c] (dB)		±0.3	±0.3
Power stability [c, d] (dB)	15 min	±0.005 (Δ= 0.01)	±0.005 (Δ= 0.01)
	8 h	±0.03 (Δ= 0.06)	±0.03 (Δ= 0.06)
Modulation frequency (internal or external sync.) (kHz)		0.010 to 300	0.010 to 300
Dithered modulation amplitude range [h] (mA)		1 to 5	1 to 5
Dithered modulation electrical waveform		Square/triangular	Square/triangular

Notes

a. Guaranteed if the ambient temperature stays between 15 °C to 30 °C.

b. In high-wavelength stability mode, better resolution is possible, but on a limited range.

c. Specified at 23 °C ± 1 °C with 50 % relative humidity.

d. After a 1-hour warmup period.

e. For 8 hours at 23 °C ± 1 °C with 50 % relative humidity.

f. Output power is specified at connector output.

g. Guaranteed at maximum power level.

h. Dithered modulation is only available internally at a typical duty cycle of 50 % duty cycle.

GENERAL SPECIFICATIONS

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		0.580 kg	1.25 lb
Temperature			
	Operating	10 °C to 40 °C	50 °F to 104 °F
	Storage	−40 °C to 70 °C	−40 °F to 158 °F
Relative humidity		0 to 95 % non-condensing	

Instruments Drivers

LabVIEW™ drivers, SCPI commands and COM/DCOM libraries

Remote Control

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

Standard Accessories

User guide, test report and Certificate of Compliance.

ORDERING INFORMATION

IQS-24XXBLD-XX-XX-XX

Wavelength band

02 = 1308 nm
03 = 1528-1565 nm C-band
04 = 1566-1606 nm L-band

Options code

P3 = user-provided DFB(s) (Call factory)
P4 = +10 dBm
P5 = +10 dBm with PMF output[b]
P6 = +13 dBm
P7 = +13 dBm with PMF output[b]

Notes

a. When PM fiber is selected, the slow axis is aligned with the connector key.

Connector code

96 = E-2000/APC[a]
EA-EUI-89 = APC/FC
EA-EUI-91 = APC/SC
EA-EUI-95 = APC/E-2000

Specified wavelength (nm)

96 = 1528.77	29 = 1554.94	62 = 1582.02
97 = 1529.55	30 = 1555.75	63 = 1582.85
98 = 1530.33	31 = 1556.55	64 = 1583.69
99 = 1531.12	32 = 1557.36	65 = 1584.53
00 = 1531.90	33 = 1558.17	66 = 1585.36
01 = 1532.68	34 = 1558.98	67 = 1586.20
02 = 1533.47	35 = 1559.79	68 = 1587.04
03 = 1534.25	36 = 1560.61	69 = 1587.88
04 = 1535.04	37 = 1561.42	70 = 1588.73
05 = 1535.82	38 = 1562.23	71 = 1589.57
06 = 1536.61	39 = 1563.05	72 = 1590.41
07 = 1537.40	40 = 1563.86	73 = 1591.26
08 = 1538.19	41 = 1564.68	74 = 1592.10
09 = 1538.98	42 = 1565.50	75 = 1592.95
10 = 1539.77	43 = 1566.31	76 = 1593.79
11 = 1540.56	44 = 1567.13	77 = 1594.64
12 = 1541.35	45 = 1567.95	78 = 1595.49
13 = 1542.14	46 = 1568.77	79 = 1596.34
14 = 1542.94	47 = 1569.59	80 = 1597.19
15 = 1543.73	48 = 1570.43	81 = 1598.04
16 = 1544.53	49 = 1571.24	82 = 1598.89
17 = 1545.32	50 = 1572.06	83 = 1599.75
18 = 1546.12	51 = 1572.89	84 = 1600.60
19 = 1546.92	52 = 1573.71	85 = 1601.46
20 = 1547.72	53 = 1574.54	86 = 1602.31
21 = 1548.51	54 = 1575.37	87 = 1603.17
22 = 1549.32	55 = 1576.20	88 = 1604.03
23 = 1550.12	56 = 1577.03	89 = 1604.89
24 = 1550.92	57 = 1577.86	90 = 1605.74
25 = 1551.72	58 = 1578.69	CU = 1308
26 = 1552.52	59 = 1579.52	
27 = 1553.33	60 = 1580.35	
28 = 1554.13	61 = 1581.18	

SAFETY

Class 1M
21 CFR 1040.10 and 1040.11
IEC 60825-1

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