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Find the *Coherent SBRC-TSM-7* at our website: ***Click HERE***

Innova Sabre

Technical Data

Leading Edge Performance. Automatically.



Key Features

Power Specifications

Beam Parameters

COHERENT LASER GROUP

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Innova Sabre.
Leading Edge Performance. Automatically.

The Innova® Sabre™ Series provides the ultimate in high power ion laser performance combined with extraordinary ease of use.

Every Innova Sabre combines an extremely stable passive design with performance-enhancing active components. Sabre's powerful Sentry laser management system optimizes all beam parameters to deliver the highest beam quality. Time-saving features, such as automatic wavelength selection, automatic mode control, and automatic Search-and-Tune, bring increased productivity to every laser project. The overall result is optimal performance and completely hands-off operation.

The Innova Sabre R combines the extremely stable passive design of the Innova Sabre with most of its performance-enhancing features to provide a high performance, high-powered scientific ion laser.

All laser functions are accessed from a compact remote-control module. Standard RS-232/422 and optional IEEE-488 ports also allow you to control Sabre and Sabre R from your computer.

Owners of both Sabre and Sabre R also receive Coherent's customer support to complete the product. Coherent provides comprehensive over-the-phone technical support, available on-site service by well-trained field service engineers, and guaranteed timely shipment of any needed parts.

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Key Sabre Features

- **Sentry System**
  Hands-off operation
  'Search and Tune'
  Automatic Mode Control

- **PowerTrack™**
  Lowest noise, best mode, and best stability

- **Series V™ Innova Plasma Tube**
  Longest tube lifetime, highest tube performance

- **Integral Heat Exchanger**
  Enhanced stability and longer tube lifetime

- **Low-Noise Magnet**
  Minimal acoustic disturbance of laser resonator and your experiment

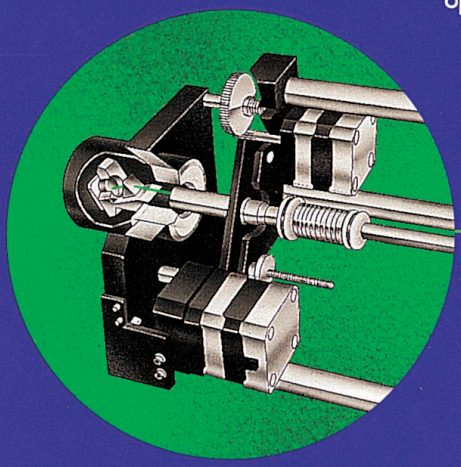
- **External Shutter**
  Laser safety mechanism

- **ν-Track**
  Stable and fast single-frequency operation

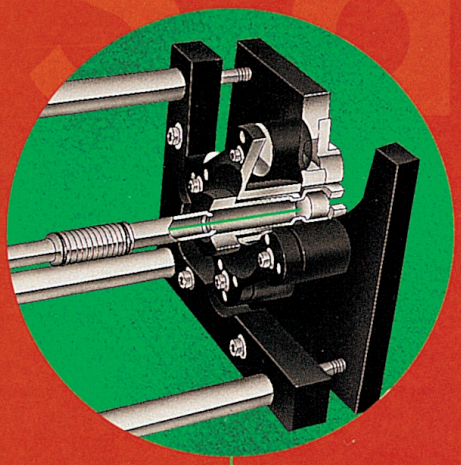
Sabre System Features

Sabre Sentry System

Sabre's Sentry laser management system continuously optimizes the optical cavity in all operating modes.



Sabre and Sabre R System Features



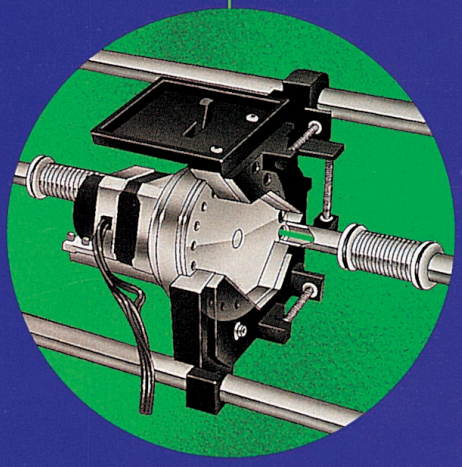
PowerTrack and ν-Track
All Sabre and Sabre R models include PowerTrack. PowerTrack automatically keeps the cavity aligned for the best mode and lowest optical noise while ensuring the highest stability and output power. In single-frequency operation, ν-Track provides stable, mode-hop-free operation within 5 minutes of system turn-on. In conjunction with the SuperInvar resonator, ν-Track also assures long-term frequency stability of better than 30 MHz/°C.

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Sabre

Automatic Mode Control

Sabre will instantly acquire any aperture once it has been selected from the remote module. Or, by selecting TEM_{00} the highest quality transverse mode is acquired. Using the integral noise detector and automatic aperture, Sabre automatically determines and sets the correct aperture size to enforce electronic TEM_{00} operation.

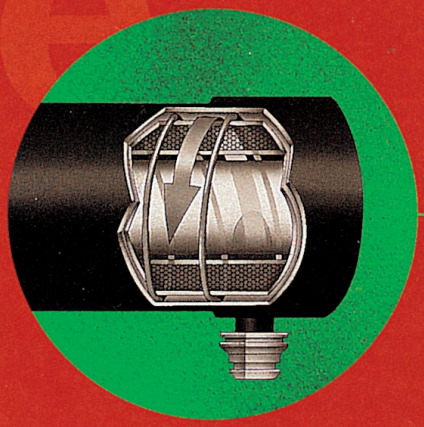


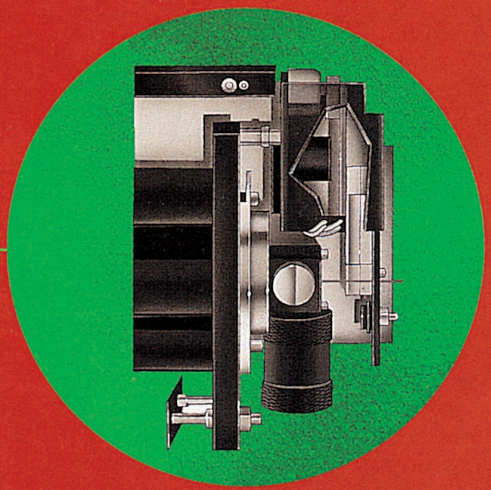
Automatic 'Search and Tune'

Cavity misalignment can occur for many reasons, and reacquiring lasing can be a frustrating and time-consuming process. With Sabre, however, selecting 'Search and Tune' from the remote module will automatically find lasing and peak for maximum power without any manual tweaking or wavelength selection by the operator.

Low-Noise Magnet

Both Sabre and Sabre R incorporate tangential-flow cooling systems resulting in minimal vibrations due to water turbulence. This significantly improves beam noise and reduces frequency jitter in single-frequency applications. It also minimizes vibrations induced into the experimental set up.





External Shutter

Sabre and Sabre R's shutter safely blocks the output beam without interrupting lasing. It can be accessed through the remote module or be used as a component of your safety interlock system.

Key Sabre R Features

- **PowerTrack**
  Lowest noise, best mode, and best stability
- **Series V Innova Plasma Tube**
  Longest tube lifetime, highest tube performance
- **Integral Heat Exchanger**
  Enhanced stability and longer tube lifetime
- **Low-Noise Magnet**
  Minimal acoustic disturbance of laser resonator and your experiment
- **External Shutter**
  Laser safety mechanism
- **ν-Track**
  Stable and fast single-frequency operation

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Sabre and Sabre R System Configurations and Available Wavelengths

System Configurations

Sabre and Sabre R systems consist of the remote control module, laser head, Series V plasma tube, power supply, and integral heat exchanger. All Sabre models use the Sentry laser management system to continually monitor all operating parameters.

Sabre and Sabre R models are available in two optical configurations: Dual Brewster Window (DBW) and Tunable Sealed-Mirror (TSM).

DBW tubes offer the complete wavelength range of ion lasers, and are designed for applications requiring optional wavelength ranges. TSM tubes provide single-line and single-frequency performance, together with the longest tube lifetimes, the lowest maintenance requirements, and the greatest ease of use.

Two Sabre R models incorporate sealed-mirror tubes for multiline (ML) operation only.

Available Wavelengths

Sabre and Sabre R models have specified performance in the visible and ultraviolet regions. For visible operation, Sabre and Sabre R models have a standard power specification for multiline operation (457.9 nm to 514.5 nm), 514.5 nm, and 488.0 nm. For UV operation, Sabre and Sabre R models are specified for multiline operation (333.6 nm to 363.8 nm), 351.1 nm, and 363.8 nm. Other wavelengths can be selected, and power specifications for these wavelengths can be ordered as options at the time of purchase.

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Sabre Output Power Specifications[1]

Sabre Argon Systems with Dual Brewster Window (DBW) Tubes

Wavelength (nm)		DBW 10	DBW 15	DBW 20	DBW 25	
Multiline Visible		**10.0**	**15.0**	**20.0**	**25.0**	
528.7		0.8	1.0	1.4	1.8	
514.5		**5.0**	**7.0**	**9.0**	**10.0**	
501.7		0.8	1.0	1.4	1.8	
496.5		1.2	1.8	2.4	3.0	
488.0		**4.0**	**6.0**	**7.0**	**8.0**	
476.5		1.2	1.8	2.4	3.0	
472.7		0.4	0.6	1.0	1.3	
465.8		0.2	0.4	0.6	0.8	
457.9		0.8	1.2	1.4	1.5	
454.5		0.2	0.4	0.6	0.8	
Wavelength (nm)		**DBW 10/2**	**DBW 15/3**	**DBW 20/4**	**DBW 25/5**	**DBW 25/7**
UV	**333.6 - 363.8**	**2.0**	**3.0**	**4.0**	**5.0**	**7.0**
UV	**351.1**	**0.6**	**0.8**	**1.2**	**1.5**	**1.8**
UV	**363.8**	**0.6**	**0.8**	**1.2**	**1.5**	**1.7**
Multiline Options						
LUV	351.1 - 385.8	1.2	2.0	2.8	3.6	4.4
SUV	300.3 - 335.8	0.7	1.5	2.0	2.5	3.0
DUV	275.4 - 305.5	0.3	0.6	0.9	1.2	1.6
275.4 only[2]	275.4	—	—	0.15	0.25	0.35
Single-Line Options						
SUV	334.5	—	—	0.40	0.45	0.50
SUV/DUV	302.4	—	—	0.28	0.33	0.38
DUV[2]	275.4	—	—	0.08	0.13	0.18

Sabre Argon Systems with Tunable Sealed Mirror (TSM) Tubes — Visible Region

Wavelength (nm)	TSM 10	TSM 15	TSM 20	TSM 25
Multiline Visible	**10.0**	**15.0**	**20.0**	**25.0**
514.5	**5.0**	**7.0**	**9.0**	**10.0**
501.7	0.8	1.0	1.4	1.6
496.5	1.2	1.8	2.4	3.0
488.0	**4.0**	**6.0**	**7.0**	**8.0**
476.5	1.2	1.8	2.4	3.0
472.7	0.2	0.5	1.0	1.3
465.8	0.1	0.4	0.6	0.8
457.9	0.8	1.2	1.4	1.5
454.5	—	—	0.3	0.5

Sabre Argon Systems with Tunable Sealed Mirror (TSM) Tubes — UV Region

Wavelength (nm)		TSM 2	TSM 3	TSM 4	TSM 5	TSM 7
UV	**333.6 - 363.8**	**2.0**	**3.0**	**4.0**	**5.0**	**7.0**
UV	**351.1**	**0.6**	**0.8**	**1.2**	**1.5**	**1.8**
UV	**363.8**	**0.6**	**0.8**	**1.2**	**1.5**	**1.7**
Multiline Options						
LUV	351.1 - 385.8	1.2	2.0	2.8	3.6	4.4
SUV	300.3 - 335.8	0.7	1.5	2.0	2.5	3.0
DUV	275.4 - 305.5	0.3	0.6	0.9	1.2	1.6
275.4 only[2]	275.4	—	—	0.15	0.25	0.35
Single-Line Options						
SUV	334.5	—	—	0.40	0.45	0.50
SUV/DUV	302.4	—	—	0.28	0.33	0.38
DUV[2]	275.4	—	—	0.08	0.13	0.18

[1] Power in watts. Standard specifications appear in bold type. Other lines and wavelength ranges available as options.

[2] The 275.4 nm single-line wavelength can be obtained with either wavelength-selective mirrors or a prism wavelength selector. Under Multiline Options, 275.4 nm is specified using wavelength-selective mirrors; under Single-Line Options, 275.4 nm is specified using a prism wavelength selector. Lower powers are specified using the prism wavelength selector.

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Sabre Output Power Specifications[1]

Sabre Krypton System with Dual Brewster Window (DBW) Tube

Wavelength (nm)			Wavelength (nm)		
Red	**647.1 - 676.4**	**4.6**	Blue/Green	468.0 - 530.9	3.5
Red	**676.4**	**0.9**	Blue/Green	482.5	0.4
Red	**647.1**	**3.5**	Blue/Green	476.2	0.4
IR	752.5 - 799.3	1.6	Blue/Green	468.0	0.5
IR	799.3	0.3	Violet	406.7 - 415.4	3.0
IR	752.5	1.2	Violet	415.4	0.28
Yellow/Green	520.8 - 568.2	3.3	Violet	413.1	1.8
Yellow/Green	568.2	1.1	Violet	406.7	0.9
Yellow/Green	530.9	1.5	UV	337.5 - 356.4	2.0
Yellow/Green	520.8	0.7	UV	350.7	0.8

Sabre Argon Systems — Single-Frequency Power

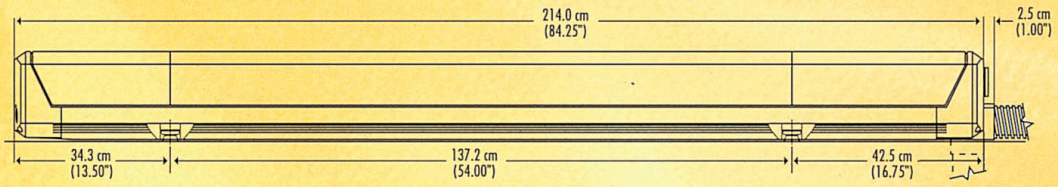
Wavelength (nm)	DBW 10, TSM 10	DBW 15, TSM 15	DBW 20, TSM 20	DBW 25, TSM 25
514.5	3.0	4.2	5.4	6.0
488.0	2.4	3.6	4.2	4.8
457.9	0.5	0.7	0.8	0.9

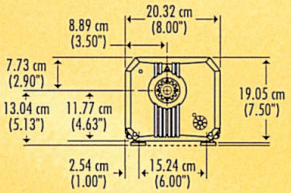
Wavelength (nm)	DBW 10/2, TSM 2	DBW 15/3, TSM 3	DBW 20/4, TSM 4	DBW 25/5, TSM 5	DBW 25/7, TSM 7
351.1	0.35	0.5	0.7	0.85	1.0
363.8	0.35	0.5	0.7	0.85	1.0

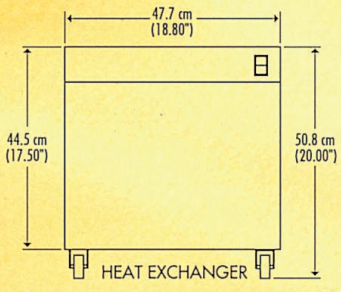
Sabre Krypton System — Single-Frequency Power

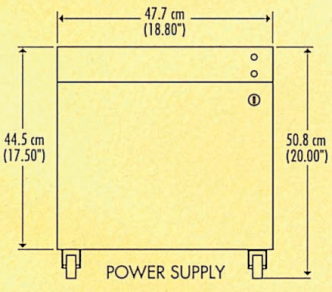
Wavelength (nm)	
647.1	2.1
413.1	1.1
350.7	0.5

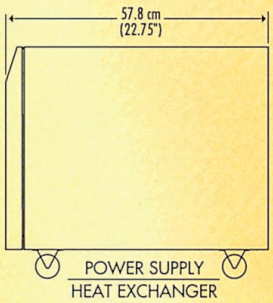
Dimensions

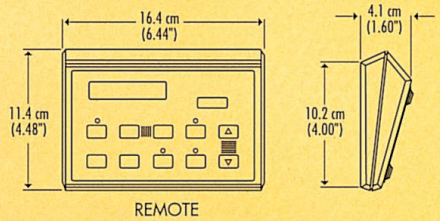












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Sabre System Features

Beam Parameters[1]

Beam Diameter (@1/e² points)[2]

514.5 nm	2.1 mm
351.1 nm	1.7 mm
647.1 nm	2.0 mm
413.1 nm	1.6 mm

Beam Divergence (full angle)

514.5 nm	0.35 mrad
351.1 nm	0.31 mrad
647.1 nm	0.50 mrad
413.1 nm	0.40 mrad

Beam Pointing Stability[3]

(Measured 1m in front of laser head)

Angle	<5.0 μrad
Offset	<5.0 μm

Long-Term Power Stability[4]

Light Regulation	±0.5%
Current Regulation	±1.0%

Optical Noise (rms)[5]

(Light regulation and current regulation)

514.5 nm	0.2%
351.1 nm	0.2%
647.1 nm	0.3%
413.1 nm	0.2%

Frequency Drift[6] ≤30 MHz/°C

Temperature Range for Mode-Hop-Free Operation[6] ±10°C

Warm-up Time to Mode-Hop-Free Operation[7] ≤5 min.

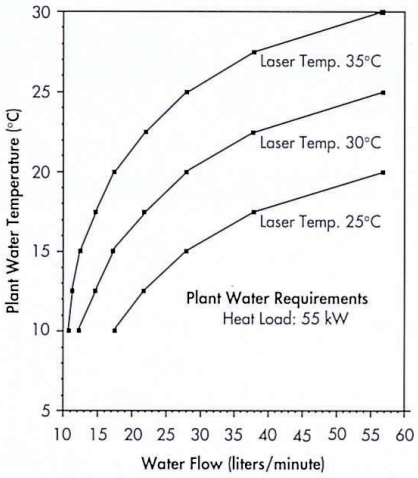
[1] All performance parameters are measured at specified output power at 514.5 nm or 351.1 nm.
[2] Beam diameter is measured at the output coupler mirror.
[3] Per °C change in air or water temperature.
[4] Maximum peak variation after a 15-minute warm-up.
[5] Measured with a 10 Hz to 2 MHz photodiode driving a resistive load at 514.5 nm or 351.1 nm at specified output power levels.
[6] Change in ambient temperature.
[7] Wavelength the same as at shut-down; key switch left on.

Utility Requirements

Input Power	3-phase with ground
Voltage	480 vac, ±10%, 50 or 60 Hz
Max. Current Draw	70 amps/phase @ 480 vac

System Weights	Crated
Laser Head	195 kg (430 lbs)
Power Supply	134 kg (295 lbs)
Heat Exchanger	102 kg (225 lbs)
	Uncrated
Laser Head	109 kg (240 lbs)
Power Supply	107 kg (235 lbs)
Heat Exchanger	75 kg (165 lbs)

Minimum plant water requirements for Heat Exchanger



Coherent's recommended plant water parameters are:

Temperature	≤25°C
Pressure Differential	40 psi-60 psi

Coherent follows a policy of continuous product improvement. Specifications are subject to change without notice.

Hologram by Dr. Hans I. Bjelkhagen of American Propylaea Corporation, and Dr. T.H. Jeong of Lake Forest College.

Sabre System Warranty

Coherent offers a limited warranty that covers parts and labor for the entire Sabre system. Please refer to the latest version of the Coherent, Inc., Laser Group, North American Price List or Scientific Product Listing for full details of this warranty coverage.

Coherent, Inc.
Laser Group
5100 Patrick Henry Drive
Santa Clara, CA 95054
Phone: 1-800-527-3786
1-408-764-4983
FAX: 1-800-362-1170
1-408-988-6838
E-mail: tech_sales@cohr.com
Web: http://www.cohr.com

Phone:
Japan +81 (3) 5635 8700
Benelux +31 (30) 280 6060
France +33 (01) 6985 5145
Germany +49 (6071) 9680
Italy +39 (02) 34 530 214
United Kingdom +44 (1353) 658 800

ISO 9002 REGISTERED





Coherent's scientific and industrial lasers are certified to comply with the Federal Regulations (21 CFR Subchapter J) as administered by Center for Devices and Radiological Health on all systems ordered for shipment after August 2, 1976.

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