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Velocity™ TLB-6700

WIDE AND FINE TUNABLE EXTERNAL CAVITY DIODE LASER

The Velocity TLB-6700 Advantage

- *True mode-hop-free wide tuning*
- *Exceptional stability with shock-proof and thermally insulated housing and magnetic damping technology*
- *Fiber coupled option with robust, permanent fiber coupling*
- *Easy-to-use wavelength control*



The New Focus™ tunable external cavity diodes lasers lead the market with high performance, delivering true continuous mode-hop-free tuning over wide wavelength ranges. The Velocity TLB-6700 is our premier tunable diode laser system offering both wide and fine wavelength scanning. The laser cavity housing is shock proof and thermally insulated with active temperature control and incorporates our unique magnetic damping technology providing higher power, stability, and narrow linewidths.

The fiber coupled option includes a robust, permanently fixed fiber port for optimal coupling efficiency maintained across the wavelength tuning range. Both the isolator and coupling are within the laser housing to ensure the highest power stability.

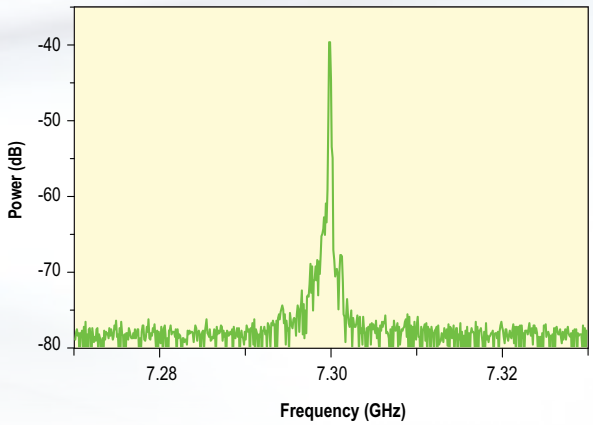
The Velocity is operated using the TLB-6700-LN controller designed with low-noise analog circuits. The laser head is recognized upon startup, and optimum temperature, maximum current limit, and tuning range are automatically set. Current limits and safety shutoff features ensure maximum diode lifetime.

Integrated wavelength monitoring allows adjustment to within 0.01 nm, and piezo fine tuning provides even finer sub-picometer precision. External control and frequency locking are possible via analog input ports, and operation in both manual and remotely programmed modes is accessed via a USB interface.

Applications

- *Spectroscopy*
- *Micro-cavity resonators*
- *Quantum dots*

Heterodyne beat note of two Velocity TLB-6712 lasers, 50 ms integration. Deconvoluted linewidth <200kHz[1]



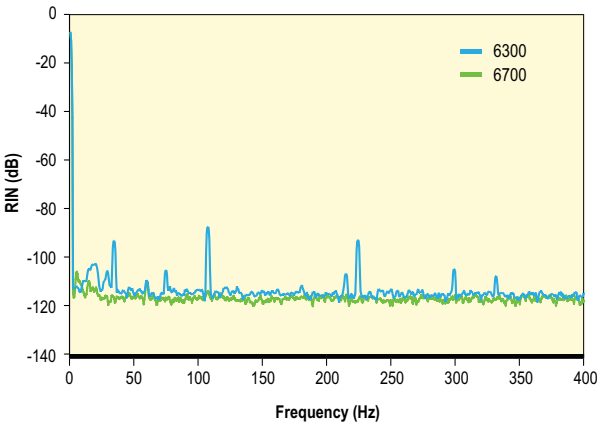
1. Typically measured performance; not a guaranteed or warranted specification.

Spectra-Physics®
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Velocity TLB-6700

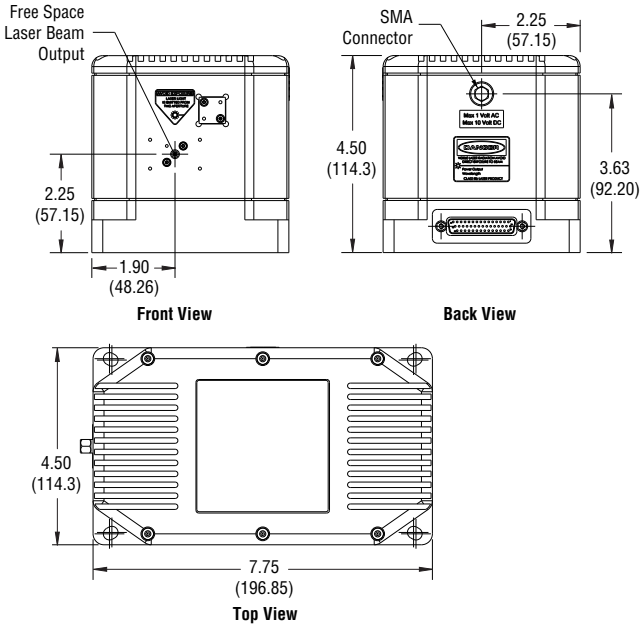
Velocity TLB-6700 Typical Performance

RIN test data for the Velocity TLB-6700 and the previous Velocity model[1]

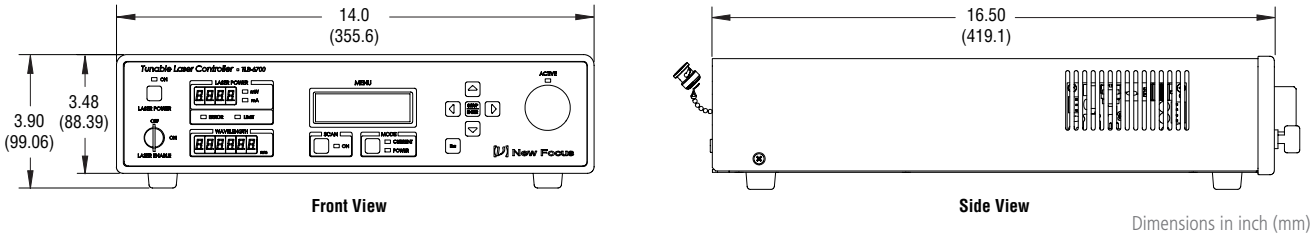


1. Typically measured performance; not a guaranteed or warranted specification.

Velocity TLB-6700 Dimensions



Controller Dimensions



Dimensions in inch (mm)

Specifications[1]

Model	Mode-Hop Free Tuning Range[2] (Wide)	Mode-Hop Free Tuning Range (Fine)	Free Space Output Power	Fiber Coupled Output Power	Maximum Tuning Speed
TLB-6702	407–412 nm	>120 GHz (65 pm)	4 mW @ 411 nm	N/A	5 nm/s
TLB-6704	635–638 nm	>80 GHz (110 pm)	8 mW @ 638 nm	2.5 mW @ 638 nm	5 nm/s
TLB-6711	730–739 nm	>80 GHz (140 pm)	20 mW @ 737 nm	10 mW @ 737 nm	8 nm/s
TLB-6712	765–781 nm	>80 GHz (150 pm)	50 mW @ 780 nm	25 mW @ 780 nm	8 nm/s
TLB-6713	792–810 nm	>80 GHz (150 pm)	20 mW @ 795 nm	10 mW @ 795 nm	8 nm/s
TLB-6716	830–853 nm	>60 GHz (150 pm)	50 mW @ 850 nm	15 mW @ 850 nm	10 nm/s
TLB-6718	890–940 nm	>50 GHz (160 pm)	15 mW @ 890 nm	5 mW @ 890 nm	10 nm/s
TLB-6719	940–985 nm	>50 GHz (180 pm)	40 mW @ 980 nm	15 mW @ 980 nm	10 nm/s
TLB-6721	1030–1070 nm	>50 GHz (200 pm)	60 mW @1064 nm	20 mW @1064 nm	10 nm/s
TLB-6722	1045–1085 nm	>50 GHz (200 pm)	40 mW @ 1080 nm	14 mW @ 1080 nm	10 nm/s
TLB-6723	1070–1130 nm	>50 GHz (280 pm)	30 mW @ 1110 nm	10 mW @ 1110 nm	10 nm/s
TLB-6724	1270–1330 nm	>50 GHz (290 pm)	30 mW @ 1300 nm	15 mW @ 1300 nm	15 nm/s
TLB-6725	1390–1470 nm	>30 GHz (200 pm)	45 mW @ 1450 nm	22.5 mW @ 1450 nm	15 nm/s
TLB-6726	1420–1500 nm	>30 GHz (210 pm)	20 mW @ 1480 nm	10 mW @ 1480 nm	15 nm/s
TLB-6728	1520–1570 nm	>30 GHz (240 pm)	30 mW @ 1550 nm	15 mW @ 1550 nm	20 nm/s
TLB-6730	1550–1630 nm	>30 GHz (260 pm)	30 mW @ 1600 nm	15 mW @ 1600 nm	20 nm/s
TLB-6732	1700–1800 nm	>20 GHz (260 pm)	10 mW @ 1780 nm	N/A	20 nm/s
TLB-6736	1975–2075 nm	>20 GHz (260 pm)	2 mW @ 2030 nm	N/A	20 nm/s
TLB-6740	2350–2450 nm	>20 GHz (360 pm)	4 mW @ 2400 nm	N/A	20 nm/s

Velocity TLB-6700

Specifications[1]

	Value
Linewidth	<200 kHz (50 ms integration time)
Wavelength Stability	2 pm (over 1 hour ±2°C)
Power Stability	<1% (over 1 hour ±2°C)
Wide Tuning Resolution	10 pm
Fine Tuning Resolution[3]	0.01% of full PZT tuning range
Fine-Frequency Modulation Bandwidth	>100 Hz (100% amplitude) 2 kHz (20% amplitude)
Current Modulation Bandwidth	DC-1 MHz (through controller) 50 kHz-100 MHz (directly to diode)[4]
Longitudinal Mode	Single
Transverse Mode	TEM_{00}
Beam Pointing Stability	<50 µrad (±2°C)
Beam Size, typical	1–2 mm
Beam Ellipticity, typical	1:1–2:1
Polarization[5]	Vertical
Optical Output[6]	Free-space, optically-isolated, fiber-coupled
User Interface	Controller front panel, USB
Power Supply Requirement	100–240 VAC (50-60 Hz), power consumption <170 W
Environment Temperature, operating	15–30 °C
Environment Temperature, storage	0–50 °C
Environment Humidity	Non-condensing

1. Due to our continuous product improvement program, specifications are subject to change without notice.
2. Motorized wide tuning and PZT fine tuning. Contact us for other available wavelengths and typical tuning curves.
3. Resolution is 10 mV in PZT (0.01% of full PZT tuning range) through controller front panel or command interface. When tuning PZT using an external voltage source through External Frequency Modulation input, resolution is dependent on voltage source.
4. Current modulation directly to diode through laser head SMA port.
5. Free space (with and without isolator) output is vertically linearly polarized with respect to laser head base.
6. Optically-isolated option includes an integrated 35 dB optical isolator for free-space output with approximately 75% power transmission. Fiber-coupled option includes isolator and permanently fixed Panda-type PM fiber with FC/APC connector for laser output. Wide-type alignment key aligned with the slow axis of the PM fiber. Dual stage isolation, other fiber types and connectors available upon request. Optically-isolated option unavailable for TLB-6732. Fiber coupled option unavailable for TLB-6732, TLB-6736, and TLB-6740. External pre-aligned fiber coupling kit available for TLB-6702.

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