

Pre-Installation Guide For WaveTrain™



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Introduction

Thank you for choosing a Spectra-Physics product. We are known for our high quality, cutting edge laser systems and accessories. It is our policy to supply systems which match as completely as possible to our customer's requirements. In order to ship a fully operational WaveTrain™ system and to guarantee a trouble-free installation and operation we kindly ask you to read section 1 and answer the following questions.

Then, please return the second page by FAX or e-mail to your local Spectra-Physics' representative. Thank you for your cooperation.

We at Spectra-Physics intend to provide you with responsive support so that you can derive great satisfaction and value in using our systems for your applications. We are available to you at 1-800-456-2552.

What we would like You to know:

Fundamental laser

The WaveTrain™ frequency doubler is an actively stabilized external ring cavity designed to enhance the power of a single frequency cw laser. In order to allow a trouble-free “cooperation” between the fundamental laser and the WaveTrain™ your pump laser system has to meet the following requirements:

CW and single longitudinal mode (SLM)

Frequency bandwidth (= frequency stability within 1ms) <1MHz

Frequency jitter (= frequency stability within 10ms) <10MHz

Frequency drift (= frequency stability within 1s) <1GHz

Mode must be reasonably Gaussian and nearly circular in shape

Linearly polarized >50:1 (direction may be adjusted)

Additionally, intensity fluctuations should be low because the nonlinear SHG process would double them.

The required input beam polarization is horizontal. Please note that there are polarization rotation optics available from Spectra-Physics.

Important notice

We ensure the proper functionality of the WaveTrain™, with special emphasis given to the control unit and the servo loop, by testing it with a single mode laser. Because of the large variety of single mode lasers available from different manufacturers, however, we cannot guarantee that your WaveTrain™ system will be tested prior to delivery with that type of laser you intend to use.

What we would like to know

Customer

Name: _____

Order # _____

Contact person for installation _____

Phone: _____

E-mail _____

Fundamental laser system

Please, check the applicable boxes and fill out the appropriate sub-section for your specific fundamental/pump laser system: Spectra-Physics

Ion laser (SLM)

- | | | |
|--------------------------------------|---------------------------------------|--------------------------------|
| <input type="checkbox"/> Argon Ion | <input type="checkbox"/> BeamLok 2060 | <input type="checkbox"/> Z-Lok |
| <input type="checkbox"/> Krypton Ion | <input type="checkbox"/> BeamLok 2080 | <input type="checkbox"/> J-Lok |

Ti:Sa Laser (SLM):

- | | | |
|-------------------------------------|-------------------------------------|-------------------------------------|
| <input type="checkbox"/> Matisse TR | <input type="checkbox"/> Matisse TS | <input type="checkbox"/> Matisse TX |
|-------------------------------------|-------------------------------------|-------------------------------------|

Dye Laser (SLM):

Matisse DR

Matisse DS

Matisse DX

Excelsior (SLM):

Wavelength [nm]_____

Power [mW]__

Other manufacturers:

Type:

Ion Laser

Ti:Sa

Dye Laser

DPSS Laser

Diode Laser

Others

Frequency actively stabilized: Yes No

Manufacturer/Model_____

Wavelength (range) [nm]_____

Maximum Output_____

Power: _____

[mW]: _____

Polarization:

Vertical

Horizontal

Unknown

Mode:

Gaussian

Circular

Unknown

Beam waist: (radius) [μm]__ Location [mm]_____

Beam diameter (1/e²) At exit port____ unknown_____

Full divergence angle: _____ At exit port____ unknown_____

Beam height above optical table (cm) _____ unknown_____

(If horizontal and vertical properties differ, please specify both)

Further remarks

Pump laser is installed install planned for (approx.)_____

Requested distance between laser exit and WAVETRAINTM entrance
[mm] _____

Main voltage 100 V 115 V 230 V other_____

Which crystal/optics set would you like to have pre-mounted for installation if you ordered more than one? crystal [nm] _____

Polarization rotator not needed ordered available

When the system Arrives

Inspection

When the system arrives, any sign of damage to the shipping crates should be brought to the attention of the delivering freight company. A claim must be filed with that commercial carrier (usually within 30 days). Notify the originating Spectra-Physics office of any shipping damage. Shipping damage is not covered by Spectra-Physics.

Your packing list will show all items that you have ordered. Open all the packages and check each item for possible damage during shipping. Check the items against your packing list. Some items may have been installed at the factory.

Each system comes with a manual; verify that you have received this item.

Please report any missing or damaged items to Spectra-Physics, or you may contact your Spectra-Physics Sales Engineer.

Review Instruction Manuals

Please read the manual to get vital information about your system. Familiarize yourself with the system. You are encouraged to spend as much time as possible reviewing the system components before your Spectra-Physics Service Engineer arrives for the installation and training.

Laser Safety Considerations

In addition to reviewing the sections in the manual regarding laser safety; be sure to have the proper safety glasses available for ALL lab personnel present during the installation and testing of your system. For more information, please call Spectra- Physics at 1-800-456-2552.

Diagnostics

During the course of installation, power measurements will be demonstrated on all of the appropriate wavelengths. Your Service Engineer can identify which specifications will be demonstrated and the equipment necessary to conduct such tests. A non- standard system will require special consideration.

- An oscilloscope (bandwidth 20 MHz or faster, two-channel with external trigger) and 3 BNC-cables (length approx. 1 m) will be required during installation and operation.

To have other published specifications demonstrated, consult with your Service Engineer to determine whether additional diagnostic equipment will be required.

Pre-Installation Considerations

Location and Environment

The location of the system and environment of your lab should have the following features:

- ✦ A safe location that meets all applicable building codes.
- ✦ The required space to install the WaveTrain™ depends strongly on the proper mode matching, but typically is ca. 1200 mm x 600 mm. The dimensions of the WaveTrain™ base plate are (BxDXH) 570 x 400 x (190 - 230) mm and of the control unit 380 x 160 x 340 mm.
- ✦ An optical table that will meet the space requirement of the instruments to be installed.
- ✦ To increase the lifetime and long-term power stability a clean and dry atmosphere (clean room or flow box) is recommended.
- ✦ Proper air conditioning could be critical for the performance of the laser. For certain applications ambient room temperature changes may be an important factor for the laser system's performance. Air ducts should not blow directly on laser or optical path.
- ✦ To ensure stable day-to-day operation, the recommended minimum and maximum operating room temperatures are 20 - 25°C. Room temperature should ideally be 22°C and should not fluctuate $\pm 1^\circ\text{C}$ during any two-hour period.
- ✦ The input beam height may be varied from 115mm to 150mm; with SHG-output beam height = input beam height.

- ✦ Depending on the beam pointing stability of your pump laser it might be advantageous for every day alignment to plan one or two bending mirrors between pump laser and WaveTrain™.
- ✦ In some applications vibration isolation may be required for your system. Structural integrity of the flooring could play an important role.
- ✦ Consider room requirements for future maintenance and upgrades by your Spectra-Physics' Field Service Engineer.

Physical Description

Dimensions and Weights

Feature	Specifications	
Size (LxWxH)	English Unit	Metric Unit
WaveTrain™ Base Plate	22.4 x 15.7 x 9.1 in.	57.0 x 40.0 x 23.0 cm
Control Unit	15.0 x 6.3 x 13.4 in.	38.0 x 16.0 x 34.0 cm
Control Unit cable length	10 ft.	3 m
Closed Loop Purge Unit	19.0 x 3.5 x 13.6 in	48.3 x 8.9 x 34.5 cm
Weight		
Wavetrain™ Base Plate	44 lb.	20 kg
Control Unit	15 lb.	7 kg
Closed Loop Purge Unit	4.5 lb	2 kg

Utility Requirements

Water: Not Required

Power Requirements

Electrical

Control Unit: 100/ 200 VAC, 50-60 Hz

115/ 230 VAC, 50-60 Hz (depending on actual setting)

Optional Closed Loop Purge Unit (CLPU): 80/ 240 VAC, 50-60 Hz

Pre-Installation Checklist

Before the arrival of your Spectra-Physics' Service Engineer please review the following pre-installation requirements. When all the requirements have been met, initial the boxes and fax a signed copy to the Spectra-Physics Service department at **(408) 980-6921**.

Physical Locations:

- A location with adequate clearance around system to conduct service and accessible by Spectra-Physics personnel.
- A temperature-controlled room.
- Utility services have been installed.
- Local building and safety codes are in compliance and have been verified.

When Your System Arrives:

- Check crates for damage.
- (If damaged, file a claim with the carrier and notify Spectra-Physics.)
- Uncrate and place the system on your work surface.
- (Two or more people may be required to lift some equipment.)
- Compare the packing list with your quotation. Call your Spectra-Physics office about any discrepancies.
- Check that all manuals were received.
- Save all packing and shipping material until the installation has been completed.
- Obtain the correct safety glasses and a power meter

Customer Signature

Date

Phone Number

Fax Number

E-Mail

Sales Order Number

Maintenance Agreement

Purge Unit (Optional)

Once a week the purge cartridge should be checked to be mainly blue. If 90% of the once blue desiccant turns into pink/white the whole cartridge needs to be replaced with a new one. It cannot be recycled.

General Procedures

The Pump Laser output power, the WaveTrain™ output power, and the mode-locking of the system should also be checked once a week by verifying output values. If any of the output characteristics have changed please all Spectra-Physics Technical support at 1-800-456-2552