

# Pre-Installation Guide for InSight® X3™ and DS™ System



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## Introduction

Thank you for purchasing the Spectra-Physics InSight<sup>®</sup> laser product. This brochure describes the pre- installation information for your laser system. Within one week of your delivery date, you will receive a call from one of our factory trained Customer Service Engineers.

Some preliminary planning is essential to avoid unnecessary delays during installation and to ensure easy operation and access to your system. You are requested to carefully consider your operating environment prior to installation. Proper coolant, power, and room temperature are required for each system.

A detailed checklist of pre-installation considerations is provided in this brochure. You are responsible for meeting these requirements prior to installation, with due consideration given to all applicable building and safety codes.

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 or [service@spectra-physics.com](mailto:service@spectra-physics.com) for Technical Support.

## 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 and noted on the invoice/shipping document before signing. A claim must be filed with that commercial carrier (usually within 30 days).

Immediately notify the originating Spectra-Physics office of any shipping damage. Open any damaged packages to inspect the contents only at the direction of Spectra-Physics. Equipment damage due to abuse in shipping is not covered by Spectra-Physics.

Your packing list will show all items that you have ordered. Check the received items against your packing list. Multiple items maybe contained in the same box. Each item should be verified at the time of installation.

Please report any missing or damaged items to Spectra-Physics at 1-800-456-2552 or [service@spectra-physics.com](mailto:service@spectra-physics.com). You should also contact your Spectra-Physics Field Sales Engineer at 1-800-775-5273 or [sales@spectra-physics.com](mailto:sales@spectra-physics.com).

### Review Instruction Manuals

Each system comes with a User's Manual. 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 manual before using the laser. Your Spectra-Physics' Customer Service Engineer can also provide any needed user training. In particular, refer to Chapter 4 of the User's Manual for more information on installation and use, which can be reviewed with the engineer.

### 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 1-800-456-2556. Please refer to Chapter 2 of the User's Manual for more information on laser safety.

### Diagnostics

During installation, power measurements will be demonstrated on all the standard wavelengths. Your Customer Service Engineer can identify any other specifications that will be demonstrated and the equipment necessary to conduct the tests. A non-standard system will require special consideration.

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

Basic diagnostic equipment such as a power meter and spectrometer are required to maintain the laser system. We recommend that you obtain this basic diagnostic equipment before the system is installed. For assistance in the selection of the proper diagnostic equipment, please contact Newport at 1-800-222-6440 or sales@newport.com.

## Pre-Installation Considerations

### Location and Environment

The system installation laboratory environment should provide the following attributes:

- A. A safe location that meets all applicable building codes.
- B. Easy access with adequate clearance around the instrument.
- C. An optical table that will meet the space requirement of the instruments to be installed.
- D. Proper laboratory temperature regulation, including sufficient air conditioning to remove the waste heat 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 temperature is 20 - 25°C. Ideal room temperature is 22°C. Room temperature fluctuations should not exceed  $\pm 1^\circ\text{C}$  during any two-hour period. See specifications in Table 1-1 and table 1-3 in the User's Manual.

- E. In some applications vibration isolation may be required for your system. Structural integrity of the flooring could play an important role. Please evaluate any need for this, prior to system installation.
- F. Please note that the laser head is very heavy and requires a sturdy and stable optical table.

Consider room requirements for future maintenance and upgrades by your Spectra-Physics' Field Service Engineer.

## Physical Description

### Dimensions and Weights

Unit	In. (L,W,H)	Cm. (L,W,H)	Lb.	Kg.
Laser Head, DeepSee	35.8 x 19.8 x 7.3	91.0 x 50.2 x 18.4	140.00	64.00
Model IPS300 Supply	17.90 x 19.00 x 6.9	45.5 x 49.3 x 17.5	35.0	15.9
Umbilical Length	10 ft	3m		
Chiller SSC TR800	20.0 x 19.0 x 10.5	50.8 x 48.3 x 26.7	55.00	25.00

## Utility Requirements

### Coolant

The InSight<sup>®</sup>X3, and InSight<sup>®</sup>DS are closed-loop coolant system and requires no utility water services. Use **ONLY** full-strength *Nalco 460-PCCL104* liquid corrosion inhibitor as a coolant. *Do not use deionized water.* Fill the chiller reservoir following the instructions in the chiller manufacturer's user manual.

Do not place the chiller above the laser. Should a leak develop, dripping coolant may damage the laser.

The chiller must always be on when the power supply is on, even if the diode lasers are not on.

## Power Requirements

### Electrical

#### Type IPS300 Single Phase<sup>1</sup> (SP# IPS300)

Voltage	100-120VAC, 50/60 Hz	200-240 VAC, 50/60 Hz
Current	10A	6A

### Chiller

Voltage	120-240 VAC, 50/60 Hz
Current	≤ 15A

## Heat Load

The InSight laser chiller and power supply are both forced air cooled devices. As such they vent their waste heat into the room environment in which they are placed. The room air handling system should be suitable to remove the waste heat generated by the laser in order to insure stable operation.

Typical heat loads to the room are around 1.2 kilowatts during normal operation. A maximum heat load of up to 2 kilowatts can be generated under extreme situations such as the room temperature being excessively hot.

## Computer Requirements

Two modes of control are offered for the standard InSight system:

- A. InSight graphical user interface (GUI) control software for use on a Windows© based computer. For more information on the control software, refer to the User's Manual.
- B. A USB, or a serial cable can be used to send commands to the laser head from the user's host system. For more information on the control software, refer to the User's Manual. In order to run the GUI control software, the control computer must meet these minimum requirements:
  - Intel or AMD 32 or 64-bit, single or multi-core processor with > 1 GHz clock speed
  - 1 GB RAM
  - 10 MB available disk space for installation
  - a CD-ROM or DVD-ROM drive
  - a mouse or other Windows®-compatible pointing device
  - a video display with 1024 x 768 (SVGA) or higher resolution
  - an available USB port.
  - Microsoft Windows XP® or Windows 7® operating system

## 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 Location:

- 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:

- Upon receiving your system, immediately inspect the outside of the shipping containers. If there is any sign of damage, immediately call Spectra-Physics and file a claim with the carrier.
- The InSight® laser system will be installed on site by a factory-trained Service engineer. Do not open the laser packaging prior to the engineer's arrival unless specifically told to do so by the factory.
- Compare the packing list with your quotation. Call your Spectra-Physics' office about any discrepancies.
- Check that all manuals were received, once unpacked.
- Save all packing and shipping material until the installation has been completed.
- Obtain the correct safety glasses and a power meter.
- Read the User's Manual, especially sections entitled "**Receiving and Inspecting**", and "**Installation**"

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**Customer Signature**

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**Date**

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**Phone Number**

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**Fax Number**

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**E-Mail**

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**Sales Order Number**

## Maintenance Agreement

To maintain a valid warranty on your Spectra-Physics system, it is necessary for the customer to assume the responsibility of performing a routine maintenance program. Failure to do so may result in the warranty being voided. Review the User Manual for the required proper maintenance instructions. The following is a subset of the instructions.

### Chiller Coolant, Nalco Mixture

The chiller requires the use of Nalco Solution (P/N 1607-0546 NALCO 460-PCCL104) as the coolant. No other cooling fluid should be used in the chiller. The use of any other coolant could result in insufficient cooling and produce a decrease of laser performance or damage to the laser system. No other chemical additives are required.

Nalco Solution is a premixed liquid corrosion inhibitor designed for use in closed loop cooling systems. It can be added without dilution directly to a closed loop cooling system in place of water or other coolant. This will result in a proper treatment for up to 6 months (even if the pink tracer turns clear).

This solution is a complete inhibitor that protects ferrous metals and copper alloys from corrosion. It is nitrite free and minimizes the challenge of bacteria control (depending on environment and usage). If the laser is not going to be used for an extended period of time, turn off the laser and drain the Nalco cooling solution.

The Nalco Cleaner (P/N 1607-0547) is used to flush your system clean of ferrous metals and copper alloys as a result of corrosion. It is recommended as a maintenance procedure that the chiller/critical cooling loop in each piece of equipment is cleaned and treated 1x per year. The laser does not have to be lasing. The cleaner should be circulated for a minimum of 8 hours (the longer the better if time permits in order to assure thorough cleaning).

**\*NOTE:** to restrict the growth of algae in the reservoir, it is recommended that the reservoir cover be kept in place and that all circulation lines be opaque. This will eliminate the entrance of light that is required for the growth of most common algae.

### Filters

The Air Purge Filter (P/N 90016698) should be replaced when the active filtering material section turns a pink or violet in color or the humidity can no longer reach  $\leq 10\%$ . This filter has an average lifetime greater than one year depending on the relative humidity and the temperature of the operating environment.

The newer model InSight, such as the X3 will be using ALPS; Active Laser Purification System. The part number is ETN-2200HT, INSIGHT PURGE CARTRIDGE. Typically, the purge cartridge should last up to two years. The purge unit in the IPS-300 power supply is not user serviceable. Please contact your Spectra-Physics service representative to schedule a visit to replace the unit.

## Maintenance Agreement (Continued)

### General Procedures

The power output and the mode-locking of the system should also be checked once a week by verifying the output values. The chiller should also be checked weekly for proper operation. Additional coolant may need to be added, due to evaporative loss, at this time.

If any of the output characteristics have changed, please call Spectra-Physics' Technical Support at **1-800-456-2552**.

### Required Maintenance:

Proper safeguards must be used when working with, or around the laser. The InSight X3, and DS lasers are Class 4 lasers that can cause serious skin and eye injury. We recommend you contact a Laser Safety Eyewear vendor that can offer proper personal protection equipment for the tunable wavelength outputs detailed in the specifications in your test summary.

### Laser measurement equipment

- Infrared (IR) viewer, such as FJW Model "Find-R-Scope"
- A spectrometer with the appropriate software, such as Ocean Optics Model USB2000+ spectrometer with grating #H4 (600 lines/mm, wavelength range 680- 1080 nm, 400 nm spectral range) with slit width of 25  $\mu\text{m}$  and 400  $\mu\text{m}$  NIR fiber with Model CC-3 VIS/NIR opaline glass cosine corrector.
- The extended tuning of the InSight requires an additional spectrometer to view the wavelengths beyond 1000nm well up to 1300nm. The SeaWave NIR Spectrometer, a top of the range NIR spectrometer, showing the smallest footprint in the market for its class, the highest data acquisition speed (>1000spectra/second) and excellent resolution (3nm) for a broad detection range in the NIR (900 - 1700nm).
- Power meter and sensor are required to measure the laser output, such as the Ophir Juno+ USB Interface and sensor. BeamTrack series 10A-PPS laser measurement sensor is adequate to measure the optical power.
- The StarLab application together with an Ophir meter turns your PC or laptop into a full-fledged laser power/ energy meter.

## Maintenance Agreement (Continued)

### Accessory Kit

Included with the laser system is a user's manual, a test summary, a packing slip listing all the components shipped with this order, and an accessory kit containing the following items:

- Hardware for mounting the InSight laser head to an optics bench.
- USB cable, AC power cords, control cables, required coolant and air purge plumbing.
- Customer GUI, proper revision typically included on a thumb drive.
- Nalco circulating solution
- Hex ball driver, and T Handle ¼" ball driver
- Beauty cover, external
- System Test Summary Datasheet.

### Preventative Maintenance

The InSight X3 and DS laser heads themselves requires no routine maintenance. Therefore, there is no reason to remove the outer cover from the laser head – there are no user-serviceable parts inside the laser. However, to keep your laser at optimal performance, the following steps should be taken approximately at least every 6 months.

- Chiller water and filter should be changed. Also, the air filters should be checked as described in the previous section.
- As discussed in the previous section, if you have the newer ALPS, it should only need replacement if the humidity is >10%. There is no visible desiccant color indicator. You can check the humidity in the DIAGNOSTICS tab. Please contact your Spectra-Physics service representative to schedule a visit to replace the unit.
- It is recommended the Nalco Cleaner be used at this time, reference the previous section as well as the User's manual.
- Verify that the chiller is set to the appropriate temperature, and good coolant level.

Reference the User's manual that came with your system. It is recommended you read the entire manual before operating the laser system.