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# Quanta-Ray Pre-Installation Guide

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Santa Clara, CA 95054  
1(800) 456-2552  
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## **Introduction**

Congratulations on your purchase of a Spectra-Physics laser system. This guide describes the pre-installation information for your laser system.

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 utility parameters must be maintained for each system.

A checklist of pre-installation considerations is provided in this guide. 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, Inc. 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**.

## When the System Arrives

### 1.1 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.

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 is supplied with a user's manual; verify that you have received it.

Please report any missing or damaged items to Spectra-Physics, or to your Spectra-Physics sales engineer.

### 1.2 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.

### 1.3 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.

### 1.4 Interlock

An external interlock receptacle for use with a remote interlock switch or relay contact is included. This interlock circuit is at a low voltage DC level and is not compatible with the 115 VAC interlock circuit of the older Quanta-Ray systems.

### 1.5 Diagnostics

During the course of installation, power measurements will be demonstrated on all of the appropriate wavelengths. To demonstrate other published specifications, consult with your Spectra-Physics Service Engineer to determine additional equipment that may be required to conduct the necessary tests. A nonstandard system requires special considerations. Our Service Engineer can identify which specifications will be demonstrated and the equipment necessary to conduct the tests. Customers are encouraged to provide their own power meter.

Ophir-Spiricon, LLC  
3050 North 300 West  
North Logan, UT 84341  
US Toll Free: 800-383-0814  
Direct: 435-753-5231

## 2.1 Location and Environment

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

- A. Safe location that meets all applicable building codes.
- B. Easy access and adequate clearance around the instrument.
- C. Consider room requirements for future maintenance and upgrades by your Spectra-Physics Service Engineer.
- D. Proper vibration isolation may be required for your system. The structural integrity of the floor may be important for some applications.
- E. Ambient room temperature control is important to the performance of the system. Room temperature changes could interfere with the system's performance. For stable operation on a day-to-day basis, the recommended room temperature range should be 15° to 25°C and should not fluctuate more than 3°C during an eight-hour period. The optimum room temperature is 20°C. The system should not be placed near air conditioning vents. This may result in changing temperature gradients near the system, as well as stir up dust particles that may settle on critical optical surfaces. Humidity should be controlled to prevent any condensation on optical surfaces.
- F. The laser should be located on an optical table.

## 2.2 Physical Description

### Dimension and Weights

<b>LAB Series</b> *Excepted LAB 190-10 (see PRO Series)				
<b>Unit</b>	<b>Dimensions</b>		<b>Weight</b>	
	SAE (inch)	Metric (cm)	kg	lb
Laser head	45.25 x 13.0 x 9.5	115 x 33 x 25	55.0	120.0
Power supply	28.8 x 21.2 x 17.2	77 x 54 x 44	68.0	150.0
Umbilical length	10.0 ft	3 m	N/A	N/A

## 2.3 Utility Requirements

Each Spectra-Physics system has its own water and electrical requirements. To ensure smooth, uninterrupted operation, each system should have dedicated utility services.

### Water Services

<b>LAB Series *LAB 190-10, use 30 Hz chart</b>			
<b>Repetition rate</b>	<b>10 Hz</b>	<b>30 Hz</b>	<b>50 Hz</b>
Flow rate	Air-cooled / 1.0 gal/min	2.0 gal/min*	2.0 gal/min*
	3.8 l/min	7.6 l/min	7.6 l/min
Pressure min/max	N.A. / 40/60 psi	40/60 psi	40/60 psi
Temperature max (F/C)	N.A. / 77° / 25 °	77 ° / 25 °	77 ° / 25 °
Temperature min (F/C)	N.A. / 63 ° /17 °	63 ° / 17 °	63 ° / 17 °
Internal steam distilled	1.0 gallon*	1.0 gallon*	1.0 gallon*
water only	3.8 liters	3.8 liters	3.8 liters
Water needed at installation	2.0 gallon* 7.6 liters	2.0 gallon* 7.6 liters	2.0 gallon* 7.6 liters
Typical water resistivity	>1 M $\Omega$ /inch	>1 M $\Omega$ /inch	>1 M $\Omega$ /inch

### Water connections

Connect 5/8" garden hose or other suitable tubing to the hose barbs on the pulsed laser supply. The hose barbs are labeled as to which is input and output. Turn on the water and check for leaks. A 25 microns particle filter assembly (not included) is required for external water filtration.

**Power Requirements**
**Electrical Services**

<b>LAB Series</b>		<b>*LAB 190-10, use 30 Hz chart</b>		
<b>Repetition rate</b>	<b>10 Hz</b>	<b>30 Hz</b>	<b>50 Hz</b>	<b>100 Hz</b>
Type 50/60 Hz	Single Phase	Single Phase	Single Phase	Single Phase
Voltage nominal	190-260 V	190-260 V	190-260 V	190-260 V
Current maximum	15 A	20 A	30 A	45 A
Gauge Wire				

**Power connections**

The line cord supplied with your system does not have a connector attached. The customer is responsible for purchasing the appropriate electrical receptacle plug to connect to the facility power. Before connecting the power supply to the line voltage source, check that all the power switches are in the “OFF” position on your power supply. If the power supply is wired directly with the line voltage source, place a switch between the source and the power supply.

**SPECTRA-PHYSICS SERVICE ENGINEERS  
 CANNOT PERFORM ELECTRICAL OR PLUMBING  
 WORK AT YOUR SITE.**

**Final Check:**

**Upon the completion of the installation of utilities, verify that  
 the services meet all building safety codes.**

## 2.4 Nitrogen Purge

You must purge your Lab Series laser with dry nitrogen, or you will void your warranty.

Nitrogen purging is required to remove any ozone build-up or moisture that may be present. The nitrogen must be left on at all times in the Lab Series because the KD\*P crystals in the harmonic generator are hygroscopic. If these crystals are not purged, the conversion efficiency will degrade over time.

Please obtain a bottle of UPH grade nitrogen and a two-stage regulator. The nitrogen should be 99.97% grade or better, moisture, and oil free.

<b>Nitrogen UHP</b>	Large bottle (501), minimal quality 3.0 (99.97%), low water content.	
<b>Pressure</b>	3.0 psi maximum	
<b>Flow rate</b>	Operating system 30 min before and after 0.7scfh	Non-operating system 0.2scfh

## Nitrogen Purge Connections

In the spare parts kit, which is located with the manual, you will find one size of CLIP-LOK hose barbs: 1/8". A flow meter is supplied with each unit.



### 3.1 Location and environment

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

- A. Safe location that meets all applicable building codes.
- B. Easy access and adequate clearance around the instrument.
- C. Consider room requirements for future maintenance and upgrades by your Spectra-Physics Service Engineer.
- D. Proper vibration isolation may be required for your system. The structural integrity of the floor may be important for some applications.
- E. Ambient room temperature control is important to the performance of the system. Room temperature changes could interfere with systems performance. For stable operation on a day-to-day basis, the recommended room temperature range should be 15°C to 25° C and should not fluctuate more than 3° C during an eight-hour period. The optimum room temperature is 20° C. The system should not be placed near air conditioning vents. This may result in changing temperature gradients near the system, as well as stir up dust particles that may settle on critical optical surfaces. Humidity should be controlled to prevent any condensation on optical surfaces.
- F. The laser should be located on an optical table.

### 3.2 Physical Description

#### Dimension and Weights

PRO Series				
Unit	Dimensions		Weight	
	SAE (inch)	Metric (cm)	kg	lbs
Laser Head	46.2 x 23.0 x 12.0	118 x 51 x 31	84.0	185.0
Power supply	30.3 x 21.2 x 27.3	77.0 x 54.0 x 69.3	114.0	250.0
Umbilical	10.0 ft	3 m	N/A	N/A

### 3.3 Utility Requirements

Each Spectra-Physics laser system has its own water and electrical requirements. To ensure smooth, uninterrupted operation, each system should have dedicated utility services.

#### Water Services

PRO series *for PRO 350 use 30 Hz chart			
Repetition rate	10 Hz	30 Hz	50 Hz
Flow rate	1.0 gal/min*	2.0 gal/min*	2.0 gal/min*
	3.8 l/min	7.6 l/min	7.6 l/min
Pressure (min/max)	40-60 psi	40-60 psi	40-60 psi
Temperature max (F/C)	77°/25 °	77 °/25 °	77 °/25 °
Temperature min (F/C)	63 °/17 °	63 °/17 °	63 °/17 °
Internal steam distilled	1.0 gallon*	1.0 gallon*	1.0 gallon*
water only	3.8 liters	3.8 liters	3.8 liters
Addition water needed at installation	2.0 gallon*	2.0 gallon*	2.0 gallon*
Typical water resistivity	>1 MΩ/inch	>1 MΩ/inch	>1 MΩ/inch

\* U.S. Gallons

#### Water connections

Connect 5/8" garden hose or other suitable tubing to the hose barbs on the pulsed laser supply. The hose barbs are labeled as to which is input and output. Turn on the water and check for leaks. A 25 microns particle filter assembly (not included) is required for external water filtration.

**Power Requirements**

**Electrical Services**

<b>Pro Series</b> *for PRO 350 use 30 Hz chart			
<b>Repetition rate</b>	<b>10 Hz</b>	<b>30 Hz</b>	<b>50 Hz</b>
Type 50/60 Hz	Single Phase	Single Phase	Single Phase
Voltage nominal	190-260 V	190-260 V	190-260 V
Current maximum	20 A	35 A	45 A

**Power connections**

The line cord supplied with your system does not have a connector attached. The customer is responsible for purchasing the appropriate electrical receptacle plug to connect to the facility power. Before connecting the power supply to the line voltage source, check that all the power switches are in the “OFF” position on your power supply. If the power supply is wired directly with the line voltage source, place a switch between the source and the power supply.

**SPECTRA-PHYSICS SERVICE ENGINEERS  
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WORK AT YOUR SITE.**

**Final Check:**

**Upon the completion of the installation of utilities, verify that  
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### 3.4 Nitrogen Purge

You must purge your PRO series laser with dry nitrogen, or you will void your warranty.

Nitrogen purging is required to remove any ozone build up or moisture that may be present. The nitrogen must be left on at all times in the PRO series because the KD\*P crystals in the harmonic generator are hygroscopic. If these crystals are not purged, the conversion efficiency will degrade over time.

Please obtain a bottle of UPH grade nitrogen and a two-stage regulator. The nitrogen should be 99.97% grade or better, moisture, and oil free.

<b>Nitrogen UHP</b>	Large bottle (501), minimal quality 3.0 (99.97%), low water content.	
<b>Pressure</b>	3.0 psi maximum	
<b>Flow rate</b>	Operating system 30 min before and after 0.7scfh	Non-operating system 0.2scfh

### Nitrogen Purge connections

In the spare parts kit, which is located with the manual, you will find one size of CLIP-LOK hose barbs: 1/8". A flow meter is supplied with each unit.

## 4.1 Location and Environment

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

- A. Safe location that meets all applicable building codes.
- B. Easy access and adequate clearance around the instrument.
- C. Consider room requirements for future maintenance and upgrades by your Spectra-Physics Service Engineer.
- D. Proper vibration isolation may be required for your system. The structural integrity of the floor may be important for some applications.
- E. Ambient room temperature control is important to the performance of the system. Room temperature changes could interfere with the system's performance. For stable operation on a day-to-day basis, the recommended room temperature range should be 15 °C to 25 °C and should not fluctuate more than 3 °C during an eight-hour period. The optimum room temperature is 20 °C. The system should not be placed near air conditioning vents. This may result in changing temperature gradients near the system, as well as stir up dust particles that may settle on critical optical surfaces. Humidity should be controlled to prevent any condensation on optical surfaces.
- F. The laser should be located on an optical table.

## 4.2 Physical Description

### Dimension and Weights

Unit	INDI Series		Weight	
	Dimensions		kg	lbs
	SAE (inch)	Metric (cm)		
Laser Head (HG)	28.84 x 7.05 x 6.00	73.3 x 17.9 x 15.2	15.0	34.0
Laser Head (IR)	19.72 x 7.05 x 6.00	50.1 x 17.9 x 15.2	11.0	25.0
Power Supply	25.46 x 21.81 x 13.13	64.7 x 55.4 x 33.4	60.0	132.0
Umbilical Length	10.0 ft	3 m	N/A	N/A
Power Cord Length	10.0 ft	3 m	N/A	N/A
Remote Cord Length	10.0 ft	3 m	N/A	N/A

### 4.3 Utility Requirements

Each Spectra-Physics system has its own water and electrical requirements. To ensure smooth, uninterrupted operation, each system should have dedicated utility services.

#### Water Services

INDI Series		
Repetition Rate	10 Hz	20 Hz
Cooling	Air - Cooled	Air - Cooled
Room temperature Max (F/C)	77°/25°	77°/25°
Room temperature Min (F/C)	63°/17°	63°/17°

### 4.4 Power Requirements

#### Electrical Services

INDI Series		
Repetition Rate	10 Hz	20 Hz
Type 50/60 Hz	Single Phase	Single Phase
Voltage Nominal	190 - 260 V	190 - 260 V
Current Maximum	15 A	20 A
AC Load	2.31 KVA	2.86 KVA

#### Power connections

The line cord supplied with your system does not have a connector attached. The customer is responsible for purchasing the appropriate electrical receptacle plug to connect to the facility power. Before connecting the power supply to the line voltage source, check that all the power switches are in the “OFF” position on your power supply. If the power supply is wired directly with the line voltage source, place a switch between the source and the power supply.

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## 4.4 Power Requirements

### Electrical Services

INDI Series		
Repetition Rate	10 Hz	20 Hz
Type 50/60 Hz	Single Phase	Single Phase
Voltage Nominal	190 - 260 V	190 - 260 V
Current Maximum	15 A	20 A
AC Load	2.31 KVA	2.86 KVA

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INDI Series		
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Voltage Nominal	190 - 260 V	190 - 260 V
Current Maximum	15 A	20 A
AC Load	2.31 KVA	2.86 KVA

##### Power connections

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**Final Check:  
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 the services meet all building safety codes.**



## Pre-Installation Checklist

To prepare for 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.1 (800) 456-2552

### **Physical Location:**

- Location accessible by Spectra-Physics personnel.
- Adequate clearance around system to conduct experiments and service.
- Temperature controlled room.
- Utility services have been installed and connector obtained.
- Local building and safety codes verified.
- A nitrogen gas cylinder with regulator valve is located near the laser.
- An AC outlet that supplies 110 V is located near the optical table.
- Test Equipment available required to demonstrate specifications.

### **When Your System Arrives:**

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

\_\_\_\_\_  
Customer Signature

\_\_\_\_\_  
Date

\_\_\_\_\_  
Phone Number

\_\_\_\_\_  
Fax Number

\_\_\_\_\_  
E Mail

\_\_\_\_\_  
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 and perform the routine maintenance program. Failure to do so may result in the warranty being voided.

### 1. Nitrogen Purge

During the installation and thereafter the LAB/PRO must be purged with the correct nitrogen purge.

### 2. Internal Water

The internal water in the PRO should be circulated for a minimum of two hours, at least once a week. The lamps do not have to be flashing.

The internal water should be flushed out and replaced every three months using distilled water that is less than 1M $\Omega$ /Inch.

The DI cartridge should be replaced when the resin on the top section turns a light brown color. This cartridge is usually replaced once a year. Part #'s \_\_\_\_\_

The particle filter is replaced when the DI filter is replaced.

If the laser is not going to be used for an extended period of time, turn off the laser and drain the internal water, then remove one side plate on each flash-lamp housing and wipe the excess water dry.

Water scale or a film develops on the gold reflectors during periods when the water is **NOT BEING CIRCULATED**. The film may develop within one to two weeks when the water is not circulating.

Cleaning the gold reflectors and flow tubes along with the re-alignment of the system is a **BILLABLE** service visit. Cleaning and alignment labor is not covered by your warranty.

### 3. External Water

The external water should be appropriate for the model laser and must meet Spectra-Physics specification requirements. Insufficient cooling causes thermal lensing in the YAG rod, which could result in a decrease of performance or damage to the laser system.

### 4. General Procedures

The threshold and the hold-off of the PRO laser should be checked once a week.  
The power output and the mode quality of the system should also be checked once a week.  
If any of the four characteristics have changed, please call Spectra-Physics Technical Support at **1-800-456-2552**.

\_\_\_\_\_  
Customer signature

\_\_\_\_\_  
Date