User Manual

PM600™

Laser Fiber Power Meter

COHERENT

User Manual
PM600
Laser Fiber Power Meter

COHERENT
7470 SW Bridgeport Rd.
Portland, OR 97224

incidental or consequential damages resulting from any defects in its documentation.

Technical Support

In the U.S.:

Should you experience difficulties with your product, or need technical information, please visit our website: www.Coherent.com. You can obtain additional support by either telephoning our Technical Support Hotline at 1.800.343.4912, or e-mailing our Support Team at support.instruments@Coherent.com. Telephone coverage is available Monday through Friday (except U.S. holidays).

If you call outside our office hours, your call will be taken by our answering system and will be returned when the office reopens.

If there are technical difficulties with your product that cannot be resolved by support mechanisms outlined above, please e-mail or telephone Coherent Technical Support with a description of the problem and the corrective steps attempted. When communicating with our Technical Support Department, via the web or telephone, the model and serial number of the product will be required by the Support Engineer responding to your request.

Outside the U.S.:

If you are located outside the U.S., visit our website for technical assistance, or telephone our local Service Representative. Representative phone numbers and addresses can be found on the Coherent website: www.Coherent.com.

Coherent provides web and telephone technical assistance as a service to its customers and assumes no liability thereby for any injury or damage that may occur contemporaneous with such services. These support services do not, under any circumstances, affect the terms of any warranty agreement between

Coherent and the buyer. Operating a Coherent product with any of its interlocks defeated is always at the operator's risk.

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Preface

This manual contains user information for the PM600™ laser fiber power meter.

U.S. Export Control Laws Compliance

It is the policy of Coherent to comply strictly with U.S. export control laws.

Export and re-export of lasers manufactured by Coherent are subject to U.S. Export Administration Regulations, which are administered by the Commerce Department. In addition, shipments of certain components are regulated by the State Department under the International Traffic in Arms Regulations.

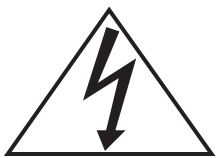
The applicable restrictions vary depending on the specific product involved and its destination. In some cases, U.S. law requires that U.S. Government approval be obtained prior to resale, export or re-export of

certain articles. When there is uncertainty about the obligations imposed by U.S. law, clarification should be obtained from Coherent or an appropriate U.S. Government agency.

Publication Updates

To view information that may have been added or changed since this publication went to print, connect to www.Coherent.com.

Symbols Used in This Document

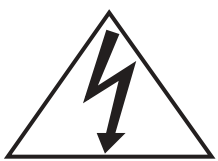


This symbol is intended to alert the operator to the presence of dangerous voltages associated with the product that may be of sufficient magnitude to constitute a risk of electrical shock.

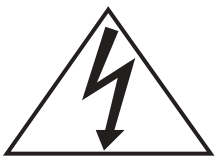
This symbol is intended to alert the operator to the presence of important operating and maintenance instructions.

SAFETY

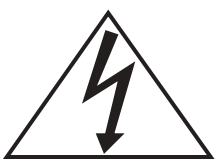
Carefully review the following safety information to avoid personal injury and to prevent damage to this instrument or any sensor connected to it. There are no user-serviceable parts in the PM600 laser fiber power meter. For service information, refer to “Obtaining Service” on page 27.



Use only the power cord specified for the meter. The grounding conductor of the cord must be connected to earth ground.



Do not operate the meter if its panels are removed or any of the interior circuitry is exposed.



Do not operate the meter in wet or damp conditions, or in an explosive atmosphere.

Operate the meter only within the specified voltage range.

Do not apply a voltage outside the specified range of the input connections.

Do not operate the meter if there are suspected failures. Refer damaged units to qualified Coherent service personnel.

Declaration of Conformity

Declaration of Conformity

We

Coherent, Inc. (formerly, Molectron Detector, Inc.)
7470 SW Bridgeport Road
Portland, Oregon, USA 97224

declare under sole responsibility that the

PM600, PM610

meets the intent of Directive 89/336/EEC for Electromagnetic Compatibility. Compliance was demonstrated per testing to EN61326 Electromagnetic Compatibility Product Family Standard for Measurement, Control, and Laboratory Equipment, to include the following test specifications as of July 2001:

EN55011 Class A Radiated Emissions

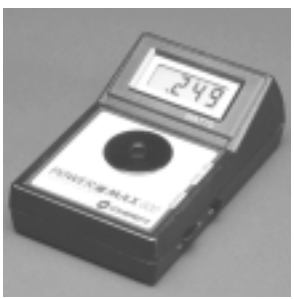
EN61000-4-2 Electrostatic Discharge – Performance Criteria B

EN61000-4-3 Radiated Immunity – Performance Criteria A

Senior Engineering Manager, Instruments — Date: 1/19/05

General Manager, LMC — Date: 1/19/05

DESCRIPTION



The PM600™ laser fiber power meter is a complete laser power system contained in a compact, battery-operated enclosure. The instrument combines an advanced-technology laser disk, low-noise, solid-state electronics, and a high-contrast, 3½-digit LCD display. Its large input port accepts the fiber output from a CW or pulsed laser and displays power in watts. The instrument is designed to provide a simple, accurate method of measuring laser fiber condition and system performance.

The PM600 can also be fitted with a standard SMA fiber connector in place of the window, making a fiber cable connection possible.The instrument features a POWER switch, ZERO ADJUST control, and LOW BATTERY indicator, and can be set up and ready to take power measurements in a matter of seconds.

FEATURES

Controls

POWER Switch The side-mounted POWER switch turns the PM600 ON and OFF.

ZERO ADJUST Control The side-mounted ZERO ADJUST control allows the user to zero the LCD before taking a measurement.

LCD

Numeric Readout The 3½-digit liquid crystal display provides digital readout directly in watts. The PM600 can display up to 19.99 watts, but was designed for use with 3-watt lasers.

LOW BATTERY Indicator

The LCD displays the LO BAT indicator when the battery voltage drops below a usable level (see “Battery” on page 13).

Accurate readings cannot be made when the LO BAT indicator is activated.

Fiber Input

FIBER INPUT Port

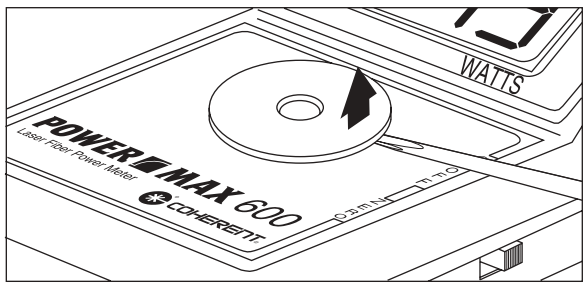
The FIBER INPUT port is a 9 mm window, designed to prevent the laser fiber from coming too close to the sensor disk inside the instrument.

Although touching the window with the laser fiber will not damage the PM600, it is recommended that measurements be made with the fiber held $^{1}/_{16}$ to $^{3}/_{16}$" above the surface of the window.

Removable Window

The window assembly is removable from the instrument. Windows of different material are available for use with a variety of laser wavelengths. SMA connector adapters are also available.

To remove the window, use a small, flathead screwdriver to carefully pry the outer edge of the window upward (see the following illustration). To install a window, drop the window into the hole on the PM600 and then press downward on the window until it snaps into place.



Battery

The battery is located in a compartment on the bottom of the instrument enclosure. To access the battery, press down on the compartment cover while sliding it outward, away from the center of the enclosure. When the LO BAT indicator appears on the LCD, replace the battery with a standard 9V transistor battery.

OPERATION

The following section describes a typical setup and procedure for using the PM600:

1. Switch the PM600 power ON, and wait for 5 seconds for the display to stabilize.
2. Verify that the LO BAT indicator does *not* appear in the LCD window.
3. Use the ZERO ADJUST control to obtain a 0.00 reading on the LCD.
4. With the laser powered up, and the foot pedal *not* depressed, place the fiber near the center of the PM600 FIBER INPUT port. Main-

tain a close-to-perpendicular angle between the window and the fiber.

The laser output can damage the front surfaces of the PM600. While making power measurements, depress the laser foot pedal only when the fiber is placed perpendicular near the center of the PM600 FIBER INPUT port.

5. Depress the laser foot pedal to transmit laser power through the fiber.
6. Watch the PM600 LCD until the reading stabilizes (approximately 6 sec.).

7. Read laser power in watts.
8. Release the laser foot pedal, and switch the PM600 power OFF.

MAINTENANCE

The PM600 contains no user-serviceable parts other than a standard 9V transistor battery (see “Battery” on page 13).

The input window port can be cleaned with most cleaning solvents, including window cleaner and alcohol. Stronger, industrial solvents such as acetone can be used on the window, but care must be taken not to expose the plastic parts of the instrument to the stronger solvents.

CALIBRATION AND WARRANTY

Calibration

Coherent laser power and energy meters are precision instruments, capable of delivering very accurate measurements, as well as providing many years of useful service. To maintain this high level of performance, it is important to have your measurement system serviced and recalibrated once a year.

Coherent Calibration Facilities and Capabilities

As the largest laser manufacturer in the world, Coherent has been able to build state-of-the-art calibration facilities containing the widest possible range of laser types and technologies. This enables us to perform instrument and sensor calibration under virtually any combination of wavelength, power, and operating characteristics. Sensors are calibrated against NIST-traceable working standard sensors which are,

in turn, calibrated against NIST-calibrated golden standard sensors. These working and golden standards are maintained with the utmost care, recalibrated annually, and verified even more regularly. We maintain multiple NIST-calibrated standards at many laser wavelengths to support the growing calibration needs of our customers. Optical calibration is a core competency at Coherent and we strive to continually improve our methods, precision, and repeatability. Additionally, most of the calibrations are performed with highly automated systems, thus reducing the possibility of human error to nearly zero. Strict quality inspections during many stages of calibration and testing assure a precise and accurate instrument that is NIST traceable and CE marked. The benefit to our customers is that instruments calibrated by Coherent

will consistently perform as expected under their actual use conditions. We are registered to ISO 9001:2000, our products are NIST traceable, and our calibration labs are fully ANSI Z540 compliant.

In addition to the technological advantage, we also strive to deliver the best service in the industry, with a knowledgeable and responsive staff, and rapid turnaround.

Limited Warranty

Coherent, Inc. (the "Company") warrants its laser power and energy meters and sensors products ("Products") to the original purchaser (the "Customer") that the product is free from defects in materials and workmanship and complies with all specifications, active at the time of purchase, for a period of twelve (12) months.

Coherent, Inc. will, at its option, repair or replace any product or component found to be defective during the warranty period. This warranty applies only to the original purchaser and is not transferable.

Extended Lifetime Warranty

Coherent, Inc. (the "Company") offers original purchasers (the "Customer") purchasing laser power and energy meters and sensors products ("Products") an extended, lifetime warranty program, which includes all parts and labor. In order to qualify for this warranty, a Customer must return the Product to the Company for recalibration and recertification (traceable to NIST and MIL-STD-45662A) within one year from the date of purchase, and annually thereafter. The Company will recertify the Product, provide software upgrades, and perform any needed repairs, for a fixed service fee (as established by the Company from time to time and in effect at the time of service).

If the Product fails and is returned to the Company within one year following the date of recalibration service, the Company will, at its option, repair or replace the Product or any component found to be defective. This warranty applies only to the original purchaser and is not transferable.

If the Product is not returned for recalibration or service prior to the one-year anniversary, the lifetime warranty program expires. The lifetime warranty program may be reinstated, at Coherent's option, after completion of a fee-based product evaluation and repair, and subsequent recalibration and recertification service.

Warranty Limitations

The foregoing warranties shall not apply, and Coherent reserves the right to refuse warranty service, should malfunction or failure result from:

- Damage caused by improper installation, handling, or use
- Laser damage (including sensor elements damaged beyond repair)
- Failure to follow recommended maintenance procedures
- Unauthorized product modification or repair
- Operation outside the environmental specifications of the product

Coherent assumes no liability for Customer-supplied material returned with Products for warranty service or recalibration.

THIS WARRANTY IS EXCLUSIVE IN LIEU OF ALL OTHER WARRANTIES WHETHER WRITTEN, ORAL, OR IMPLIED. COHERENT SPECIFICALLY DISCLAIMS THE IMPLIED WARRANTIES OF MERCHANTABILITY AND FITNESS FOR A PARTICULAR PURPOSE. IN NO EVENT SHALL THE COMPANY BE LIABLE FOR ANY INDIRECT, INCIDENTAL, OR CONSEQUENTIAL DAMAGES IN CONNECTION WITH ITS PRODUCTS.

Obtaining Service

In order to obtain service under this warranty, Customer must notify the Company of the defect before the expiration of the warranty period and make suitable arrangements for the performance of service. The Company shall, in its sole discretion, determine whether to perform warranty service at the Customer's facility, at the Company's facility, or at an authorized repair station.

If Customer is directed by the Company to ship the product to the Company or a repair station, Customer shall package the product (to protect from damage during shipping) and ship it to the address specified by the Company, shipping prepaid. The customer shall pay the cost of shipping the Product back to the Customer in conjunction with annual recalibration and repair; the Company shall pay the cost of shipping the Product back to the Customer in conjunction with product failures within the first twelve months of time of sale or between annual recalibrations.

A Returned Material Authorization number (RMA) assigned by the Company must be included on the outside of all shipping packages and containers. Items returned without an RMA number are subject to return to the sender.

For the latest Customer Service information, refer to our website: www.Coherent.com.

Detailed instructions on how to prepare a product for shipping are shown under “Product Shipping Instructions” on page 30.

Table 1. Coherent Service Centers

LOCATION	PHONE	FAX	E-MAIL
USA	1.800.343.4912	971.327.2777	info_service@Coherent.com
Europe	+49-6071-968-0	+49-6071-968-499	info_service@Coherent.com
International	971.327.2700	971.327.2777	info_service@Coherent.com

Product Shipping Instructions

To prepare the product for shipping to Coherent:

1. Contact Coherent Customer Service (refer to Table 1, "Coherent Service Centers," on page 29) for a Return Material Authorization number.
2. Attach a tag to the product that includes the name and address of the owner, the person to contact, the serial number, and the RMA number you received from Coherent Customer Service.
3. Wrap the product with polyethylene sheeting or equivalent material.
4. If the original packing material and carton are not available, obtain a corrugated cardboard shipping carton with inside dimensions that are at least 6 in. (15 cm) taller, wider, and deeper than the

product. The shipping carton must be constructed of cardboard with a minimum of 375 lb. (170 kg) test strength. Cushion the instrument in the shipping carton with packing material or urethane foam on all sides between the carton and the product. Allow 3 in. (7.5 cm) on all sides, top, and bottom.

5. Seal the shipping carton with shipping tape or an industrial stapler.

6. Ship the product to:

   Coherent, Inc.
   7470 SW Bridgeport Rd.
   Portland, OR 97224
   Attn: RMA # (add the RMA number you received from Coherent Customer Service)

SPECIFICATIONS

Table 2. Specifications

Spectral Response	350 to 2100 nm
Power Range	100 mW to 10W (10 sec. duration)
Max. Recommended Continuous Power	1W
Max. Stable Reading at 3W	30 sec.
Typical Response Time	6 sec.
Display	$3^1/_2$-digit LCD

Table 2. Specifications (Continued)

Fiber Input Aperture	9 mm or SMA connector
Battery Type	9V transistor battery
Battery Life Alkaline Heavy Duty Carbon-Zinc	 100+ hr. 75+ hr. 50+ hr.
Size (h x w x d)	14.6 x 9.3 x 5.6 cm (5.75 x 3.65 x 2.20 in.)
Accuracy	± 5% NIST traceable
Repeatability	± 1%

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