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LASER POWER METER
TPM-300-CE
INSTRUCTION MANUAL
121-45130



Revision 5
November 2008

Warranty

The GENTEC TPM-300-CE Laser Power Meter carries a one year warranty (from date of shipment) against material and/or workmanship defects, when used under normal operating conditions. The warranty does not cover damages related to battery leakage or misuse.

GENTEC will repair or replace, optionally, any TPM-300-CE which proves to be defective during the warranty period, except in the case of product misuse.

Any attempt by an unauthorized person to alter or repair the product is also not covered by the warranty.

The manufacturer is not liable for consequential damages of any kind.

Customers must fill in and mail the warranty card in order to validate the guarantee.

In the case of a malfunction, contact local GENTEC distributor or nearest GENTEC office to obtain a return authorization number. The material should be returned to:

For customers in other countries:

Gentec Electro-Optics, Inc.
445, St-Jean-Baptiste, Suite 160
Québec, Qc
Canada G2E 5N7
Tel: (418) 651-8003
Fax: (418) 651-1174
e-mail: info@gentec-eo.com

www.Gentec-EO.com

CLAIMS

To obtain warranty service, contact your nearest Gentec agent or send the product, with a description of the difficulty, transportation and insurance prepaid, to the nearest Gentec agent. Gentec assumes no risk for the damage in transit. Gentec will, at its option, repair or replace the defective product free of charge or refund your purchase price. However, if Gentec determines that the failure was caused by misuse, alterations, accident or abnormal condition of operation or handling, you will be billed for the repair and the repaired product will be returned to you transportation prepaid.

SAFETY INFORMATION

Do not use the TPM-300-CE if the device or the detector look damaged, or if you suspect that the TPM-300-CE is not operating properly.

Appropriate installation must be done for water cooled and air-force cooled detectors. Refer to the instruction manual for more informations. User should wait for a while before any manipulation of these detectors after application of power. (High temperature of some surfaces of these detectors after use may cause injury if not well cooled-down.)

Note: This equipment has been tested and found to comply with the limits for a Class B digital device, pursuant to part 15 of the FCC Rules. These limits are designed to provide reasonable protection against harmful interference in a residential installation. This equipment generates, uses, and can radiate radio frequency energy and, if not installed and used in accordance with the instructions, may cause harmful interference to radio communications. However, there is no guarantee that interference will not occur in a particular installation. If this equipment does cause harmful interference to radio or television reception, which can be determined by turning the equipment off and on, the user is encouraged to try to correct the interference by one or more of the following measures:

- Reorient or relocate the receiving antenna.
- Increase the separation between the equipment and receiver.
- Connect the equipment into an outlet on a circuit different from that to which the receiver is connected.
- Consult the dealer or an experienced radio/TV technician for help.

Caution: Changes or modifications not expressly approved in writing by GENTEC Inc. may void the user's authority to operate this equipment.

SYMBOLS

The following international symbols are used in this manual:



Instruction manual symbol. Refer to the manual for specific Warning or Caution information to avoid any damage to the product.



DC, Direct Current

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1 INTRODUCTION



The TPM-300-CE is the highest quality Laser Power Meter available on the market. In order to obtain the maximum performance from the TPM-300-CE, it is preferable to read the following manual carefully.

The TPM-300-CE has been specially designed for laser maintenance applications and laser power spot checks, but its characteristics make it useful for general laser beam power and measurement applications.

Each GENTEC TPM-300-CE is thoroughly tested and calibrated prior to shipment.

All TPM-300-CE units should be visually inspected after removal from the shipping containers. Should any damage be found, retain all packaging materials and shipping receipts. Any damage claim should be made promptly with the transportation company. Notify the nearest GENTEC representative concerning the claim, so that any repair or replacement can be arranged within the shortest delay.

2 THE TPM-300-CE DIGITAL POWER METER



2.1 Introduction

The TPM-300-CE is a digital/analog power meter designed to be used with any of the new PS Series detector heads (see section 3.1 for further details). No calibration is required when connecting the detector heads. The TPM-300-CE is already internally set to accept all the PS Series detector heads.

The TPM-300-CE is a reliable, accurate, simple and easily transportable meter engineered according to the most recent optimal operation technology.

The following specifications are based on a one-year calibration cycle, an operating temperature of 18 to 28°C (64 to 82°F) and a relative humidity not exceeding 80%.

The RS-232 output is designed to work with a standard shielded DB-9 cable for serial communication.

2.2 Specifications

Power Ranges	30mW, 100mW, 300mW, 1W, 3W, 10W, 30W, 100W, 300W, 1kW, 3kW, 10kW
Batteries	5 rechargeable NiCad AA (1.2 Volts)
Autonomy	> 8 hours
Dimensions (mm)	243 (W) x 123 (H) x 87 (D)
Weight	1.6 kg
Resolution (digital)	100 μ W on 30 mW scale
Monitor accuracy	\pm 0.5%
Response Time	1.0 sec (final value)
Analog Output 0-1V	\pm 1.0%
Analog Display (mm)	91 (W) X 40 (H) analog panel meter
Digital Display	4-digit LCD readout



Input voltage 12 VDC/(200 mA to 1 A)



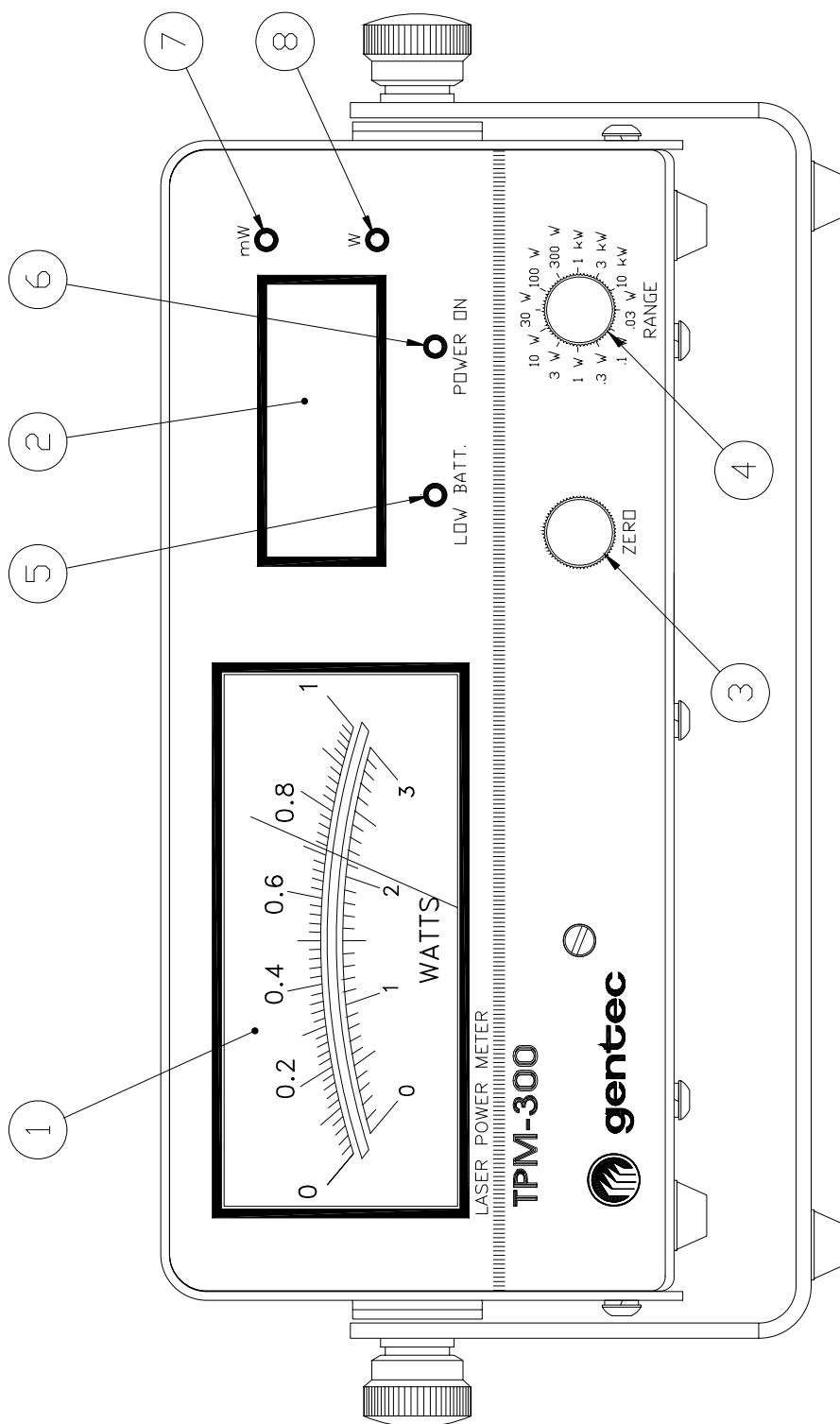
External power supply: Input : 220/240 Vac, 50 Hz, CE/VDE/TUV approved;
Output : 12V D.C 1A
or
Input : 100/120 Vac, 60 Hz, CSA/UL approved
Output : 12V D.C 800mA

2.3 Front Panel Description

Refer to Fig. 2-1

- 1- Analog meter:
The meter provides an analog indication of measured power, more specifically, it clearly indicates the power change tendency (i.e. increase, decrease).
- 2- Digital LCD meter:
The 4-digit LCD meter provides a precise numeric display of measured power to the accuracy stated in the specifications.
- 3- ZERO adjustment:
The ZERO adjustment permits the nulling of the detector zero offset.
- 4- RANGE adjustment:
The RANGE adjustment permits the selection of the power range.
- 5- LOW BATT. light indicator:
The LOW BATT. indicator signals the necessity of a battery recharge.
- 6- POWER ON light indicator:
THE POWER ON indicator signals that the meter is ON (back panel ON/OFF switch).
- 7- mW light indicator:
The mW indicator signals a digital meter readout in milliwatts.
- 8- W light indicator:
The W indicator signals a digital meter readout in Watts.

Fig. 2-1 TPM-300-CE Front Panel



Sk-8058

2.4 Back Panel Description

Refer to Fig.2-2

1- ON/OFF switch:

The TPM-300-CE is switched ON or OFF by pressing the ON*OFF switch. When the TPM-300-CE is not in use, switch it off in order to prevent battery leakage and to extend meter autonomy.

2- EXTERNAL POWER SUPPLY INPUT JACK:

Input voltage requirement: 12 VDC/(200 mA. to 1 A)

3- RS-232 INTERFACE CONNECTOR:

This interface allows remote control and data transfers between the TPM-300-CE and a computer, a terminal, a printer or any device that has a RS-232 communication port.

4- 0-1 VOLT ANALOG OUTPUT:

This output permits the monitoring of the laser average power by using external equipment such as a chart recorder, a computer with an analog interface, a voltmeter, etc.

The output signal is the amplified and anticipated power detector response. In order to improve the signal to noise ratio, the 1 Volt value corresponds to the full scale reading of the selected range. The power is then related to the output voltage and to the selected range according to the following equation: $\text{Power} = V \text{ output} \times \text{Range}$

Examples:

1.00 Volt corresponds to 1 Watt on the 1W range

0.25 Volt corresponds to 25 milliwatts on the 100mW range

0.10 Volt corresponds to 30 milliwatts on the 300mW range

Note: the ZERO adjustment dial has no effect on the output voltage.

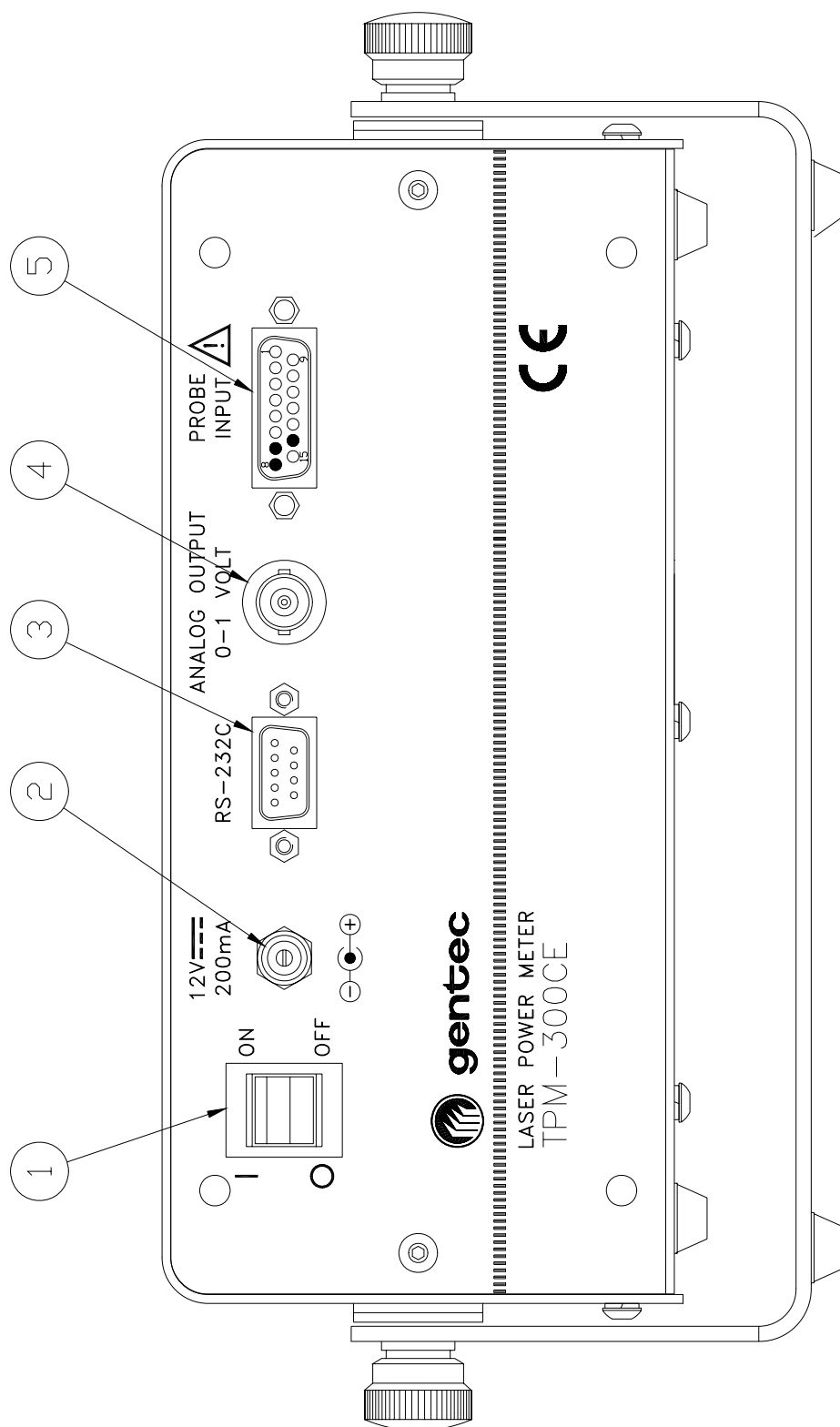
Specifications:

Maximum output voltage:	1 Volt
Maximum output current:	20 mA
Output impedance:	10KOhms
Connector type:	Male BNC

5- PROBE INPUT jack:

Used to connect detector head (probe).

Fig. 2-2 TPM-300-CE Back Panel



Sk-8059

3 OPERATING INSTRUCTIONS



This section contains important information concerning the installation and operation of the TPM-300-CE.

3.1 Probe Input Jack Information

The TPM-300-CE uses a DB-15 female connector to mate with the new PS Series Laser Power Detectors.

Pins 7, 8 and 14 of this connector are blocked to prevent mating with older series detectors. In addition, these pins will be absent on the mating male connector of the new power heads.

WARNING: This connector, though similar to that of the older TPM-310 and TPM-330 monitors, is incompatible with PS-310 Series Version 1 and PS-330 Series Version 1 power detector heads which used a different technology and do not have the same pin-out configuration.

Any attempt to modify older version connectors to mate with the TPM-300-CE can result in damage to the TPM-300-CE monitor.

The Gentec-eo inc V1 to V2 (100-16651) adapter can be used to permit connection of the PS-310 Series and PS-330 Series Version 1 power detector heads. Please contact your local GENTEC distributor or the nearest Gentec-eo inc office for further information (see WARRANTY page).

3.2 Power Measurement Procedure

- 1- Install the power detector head on its optical stand.
- 2- Connect the power detector head to the TPM-300-CE using the PROBE INPUT jack.
- 3- Slide the latch to the left to lock the connector into place.
- 4- Remove the power detector cap.
- 5- Put the power detector head into the laser beam path (laser beam must be contained within the sensor area, do not exceed power or power density maximums).
- 6- Block off laser radiation to the detector.
- 7- Switch ON the TPM-300-CE using the ON/OFF switch.
- 8- Select the required range using the RANGE adjustment. If the selected range does not correspond to the detector's input power range, a buzzer will be heard. Select an appropriate range to stop buzzer.
- 9- After the meter stabilizes, null the detector's zero offset using the ZERO adjustment and the digital meter (see Notes).
- 10- Apply the laser beam to the power detector head.
- 11- The laser beam average power will be displayed on both the digital and analog meters.

Notes: - Refer to specific PS Series power detector manuals for complete installation and operating instructions.

- The PS Series power detectors are thermal sensors sensitive to temperature variations.

For very precise measurements, it is recommended to:

- allow power detector temperature stabilization before zeroing the display.
- not touch the detector head when handling the power detector.
- avoid forced air flow or drafts around the detector.

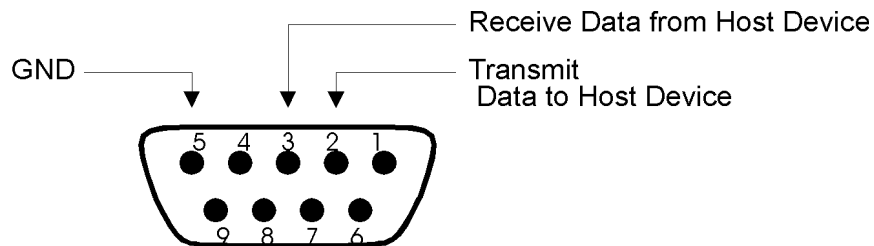
4 RS-232 COMMUNICATION INTERFACE



4.1 Installation

Connect the TPM-300 RS-232 connector, (located at the back panel of the instrument) to the host device serial connector with the proper cable. The TPM-300 connector pin assignment is as follows:

The RS-232 connector on the TPM-300 rear panel is a 9-pin connector (DB-9, female connector).



4.2 Communication Setting

When you turn ON the device it automatically defaults to 9600 baud no parity (8 data bits).

4.2.1 Baud Rate Selection

You can select one of five baud rates for RS-232 operation.

The baud rate can be set only from a computer or a terminal.

Select one of the following : 1200, 2400, 4800, 9600 or 19200 baud.

4.2.2 Parity Selection

You can select the parity for RS-232 operation.

The parity can be set only from a computer or a terminal.

Select one of the following: None (8 data bits), Even (7 data bits), or Odd (7 data bits). When you set the parity, you indirectly set the number of data bits.

4.3 Input command and answer messages

The format of a valid command is as follow:

***COMMANDNAME:**

“*” : Start of command
 “.” : End of command

When the TPM-300 receives a valid input command, it confirms to the host device that the command has been received and return the answer as follows.

The command name must be in capitals:

Command Name	Description	Answer
READPOWER	Displays Power in WATTS	±XXX W or ±XX.Xx10 ⁻³ W
READ0-1V	Displays 0-1 volt analog reading	0.XXX
MAKE_OFFSET	Cancels the offset and disables the OFFSET and SCALE buttons	OK
REPEAT	Repeats power or analog output values	OK
STOP	Stops the repeat commands	OK
REMOTE	Disables the OFFSET and SCALE buttons	OK
LOCAL	Enables the OFFSET and SCALE buttons	OK
ANTICIPATEON	Enables anticipation	OK
ANTICIPATEOFF	Disables anticipation	OK
SCALE0.03	Selects 30mW scale	OK
SCALE0.1	Selects 100mW scale	OK
SCALE0.3	Selects 300mW scale	OK
SCALE1	Selects 1W scale	OK
SCALE3	Selects 3W scale	OK
SCALE10	Selects 10W scale	OK
SCALE30	Selects 30W scale	OK
SCALE100	Selects 100W scale	OK
SCALE300	Selects 300W scale	OK
SCALE1000	Selects 1000W scale	OK
SCALE3000	Selects 3000W scale	OK
SCALE10000	Selects 10000W scale	OK
BR19200	Selects 19200 baud rate	OK
BR9600	Selects 9600 baud rate	OK
BR4800	Selects 4800 baud rate	OK
BR2400	Selects 2400 baud rate	OK
BR1200	Selects 1200 baud rate	OK
NOPARITY	Selects “No” parity	OK
ODDPARITY	Selects “Odd” parity	OK
EVENPARITY	Selects “Even” parity	OK
SCALE?	Displays the current scale	X mW or XW
SENSITIVITY?	Gives the detector sensibility	X.XXXXXX V
RESPONSETIME?	Gives the detector responsetime	X.XXX S

Error messages

The following error messages may be sent by the TPM-300

Invalid token: Input commands must be started with * character.
Invalid command: Input command does not correspond with the command listing.
Invalid scale: The selected scale does not correspond to the detector's input power range.

5 MAINTENANCE



5.1 Battery Charging

As mentioned previously, the TPM-300-CE power meter is operated using 5 standard rechargeable nickel cadmium batteries. When the LOW BATT. indicator is lit, recharge the batteries by connecting the external power supply for 12 hours. TPM-300CE can be On or Off during this procedure. One battery charge will provide up to 8 hours of operation autonomy.

Appendix A

Recycling and separation procedure.

This section is used by the recycling center when the monitor reaches its end of life. Breaking the calibration seal or opening the monitor will void the TPM-300-CE warranty.

The complete Monitor contains

1 Monitor

1 power supply (not manufactured by Gentec-eo)

1 instruction manual

1 calibration certificate

Separation:

Paper : Manual and certificate

NiCd batteries: inside the monitor.

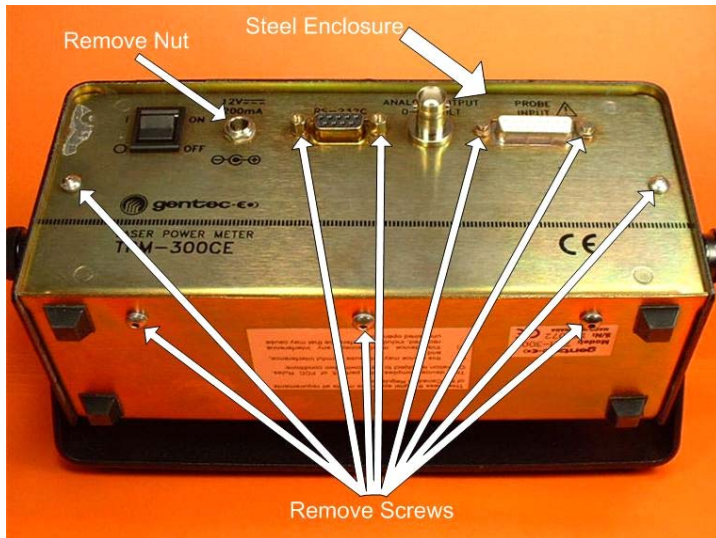
Liquid crystal display: Less than 100 cm².

Printed circuit board: inside the monitor.

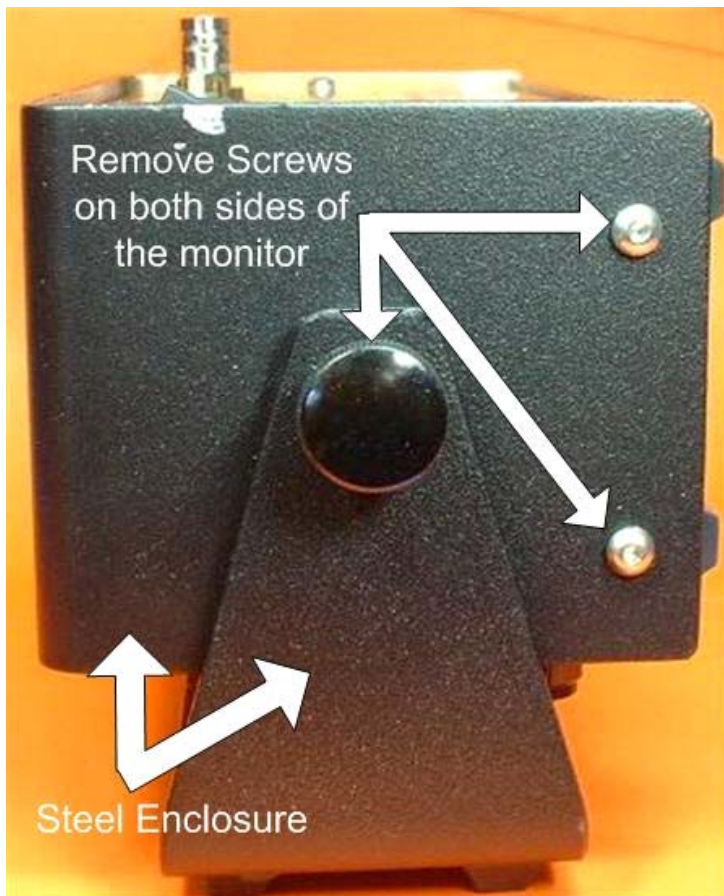
Analog needle: plastic and metals.

Dismantling procedure:

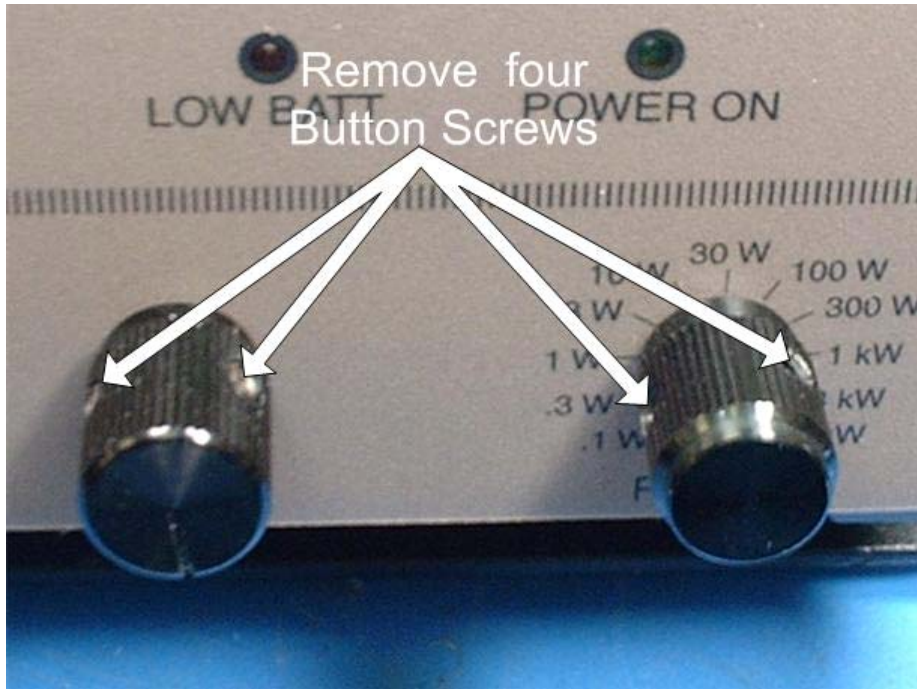
Opening the monitor, remove screws:



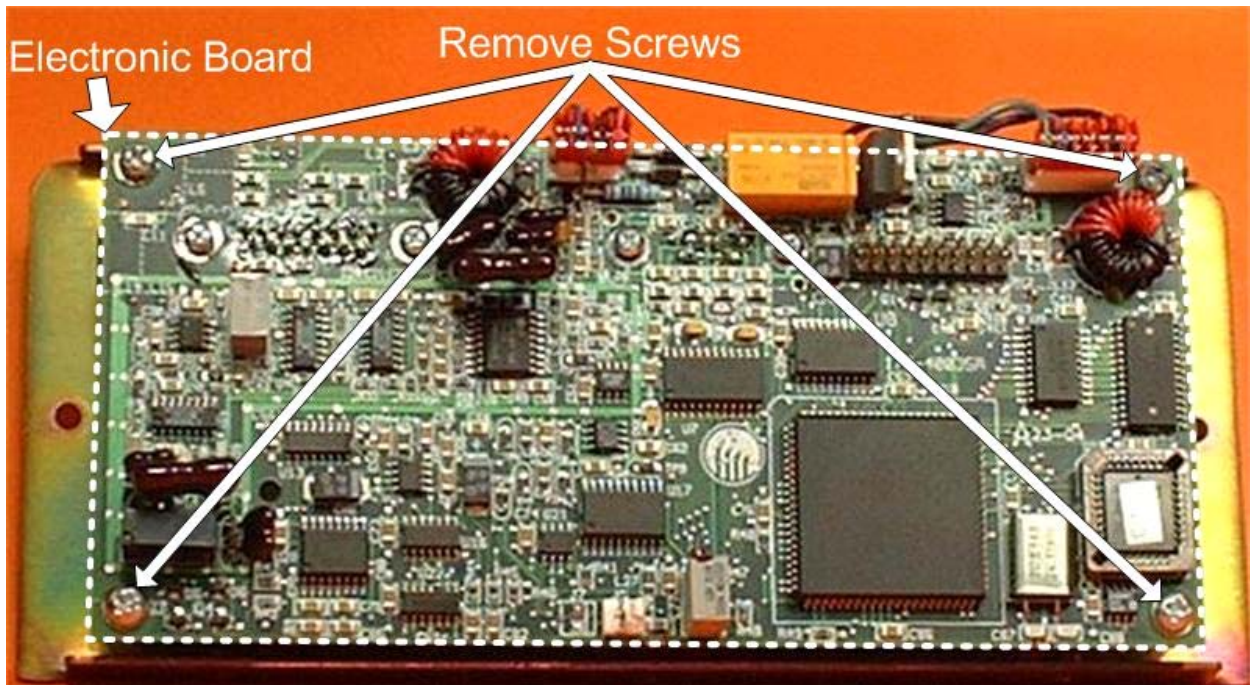
Remove screws:



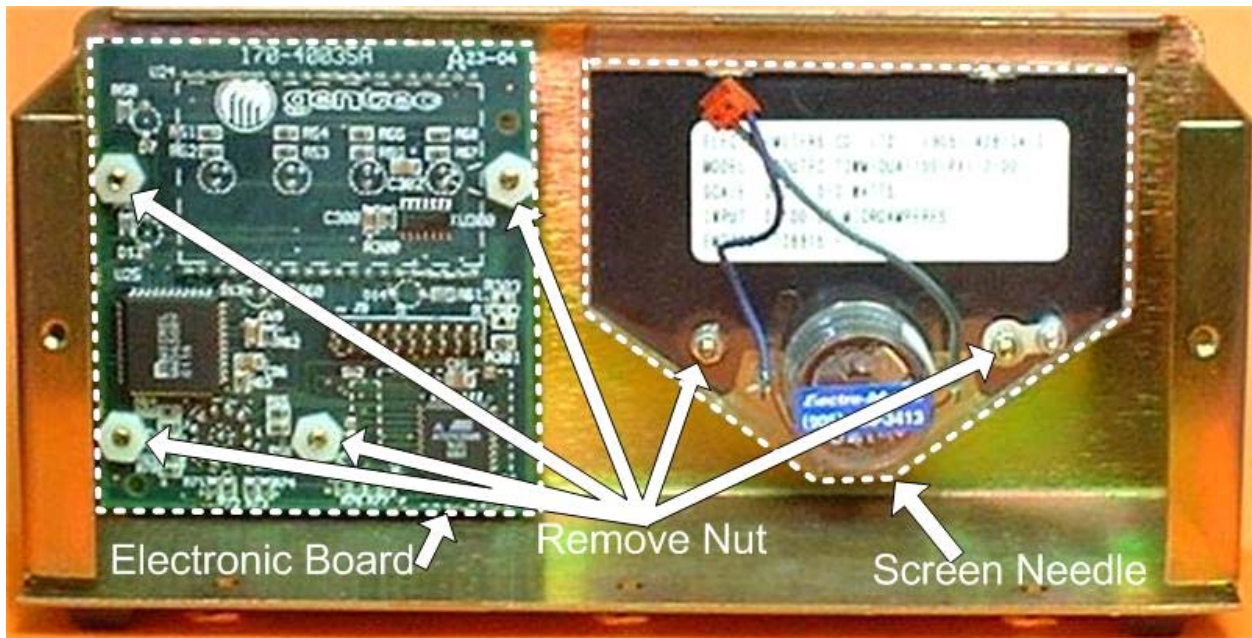
Remove screws:



Remove screws:



Remove screws:



Declaration of Conformity

Application of Council Directive(s) : 89/336/EEC The EMC Directive
73/23/EEC Low Voltage Directive

Manufacturer's Name : GENTEC ELECTRO-OPTICS, INC.
Manufacturer's Address : 455, St-Jean-Baptiste, Suite 160
Québec, Qc
Canada G2E 5N7

European Representative Name : Laser Components S.A.S.
Representative's Address : 45 bis Route des Gardes
92190 Meudon (France)

Type of Equipment: Laser Power Meter
Model No.: TPM-300
Year of manufacture: 1996

Standard(s) to which Conformity is Declared:

EN 50081-1:1992 Emission generic standard - Part 1: Residential, commercial and light industrial
EN 50082-1:1993 Immunity generic standard - Part 1: Residential, commercial and light industrial

Standard	Severity Applied	Performance Criteria
EN 55022:1987	Emission measurement	Class B
EN 60555-2:1987	Does not apply	
EN 60555-3:1987	Does not apply	
EN 55014:1988	Does not apply	
EN 61000-4-2:1995	Up to ± 6 kV Current injection discharges	A
IEC 801-3:1984	10 V/m, 27-100 Mhz, 80% AM with 1kHz sine wave	A
EN 61000-4-4:1995	± 2000 V on AC lines, ± 1000 V on data lines	A

I, the undersigned, hereby declare that the equipment specified above conforms to the above Directive(s) and Standard(s).

Place : Québec (Québec)

(Signature)

Date : 24 November 2000

Michel Giroux
(Full Name)

President



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