

L A S E R

model TECH-263 Basic

INSTRUCTION MANUAL

Moscow

INFORMATION

**The electromagnetic compatibility (2004/108/EC(EMC)) and low voltage Directives
(2006/95/EC(Low Voltage))**



CE marking

Our products are manufactured in accordance with the requirements of following directives and national regulations based on the directives:

Electromagnetic Compatibility EMC 2004/108/EC
Low Voltage 2006/95/EC(Low Voltage)

Directive 2002/95/EC RoHS



Our products are designed and manufactured in compliance with the restriction of the use of hazardous substances (RoHS) in electrical and electronic equipment Directive.

Our products have been tested and do not contain hazardous substances in amounts exceeding limits, which could have negative effects on human health or the environment.

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1 PREFACE

The Instruction Manual describes the installation, operation, service requirements and properties of the model TECH-263 Diode-Pumped Q-switched Laser with AOM.

APPLICATIONS

Marking
Spectroscopy
Research & Development
Optical Testing

FEATURES

All Solid State
Compact design
Air cooling - no liquid cooling disadvantages
Ease of handling
High quality laser beam
External/internal triggering
Energy and pulse repetition rate PC control
Stability
Reliability
Best price/quality ratio

2 WARNINGS AND SAFETY MEASURES

NOTICE:

KNOWLEDGE OF THIS MANUAL IS A PREREQUISITE FOR PROPER WORK WITH THE LASER. BEFORE USING THE LASER, PLEASE CAREFULLY READ THESE INSTRUCTIONS. HEED ALL WARNINGS. PLEASE, RETAIN THESE INSTRUCTIONS FOR FUTURE USE.

WARNING!

DO NOT DISASSEMBLE LASER HEAD, POWER SUPPLY UNIT OR OTHER PARTS OF LASER.
NO USER-SERVICEABLE COMPONENTS INSIDE THE LASER.
AUTHORIZED SERVICE PERSONNEL ONLY MAY OPEN THE LASER.
SERVICING IS PERFORMED BY AUTHORIZED SERVICE PERSONNEL ONLY.
WARRANTY VOIDS IF ANY OF LASER PARTS HAVE BEEN OPENED.

IMPORTANT SAFEGUARDS AND WARNINGS

- 1 Follow all safety instructions of this instruction manual. Improper installation and use of laser endangers the safety of operator, and reduces reliability and lifetime of the laser.
- 2 Installation and control of the laser should be carried out in accordance with this manual.

INFORMATION

Laser-export Co.Ltd reserves the exclusive right to make changes to this manual, Basications and/or design of the device without prior notice.

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3 LASER SAFETY

DANGER!

Model TECH-263 Basic corresponds to CLASS IV (CDRH) High Power laser. The output beam is, by definition, a safety hazard. AVOID DIRECT EXPOSURE TO BEAM. It emits INVISIBLE LASER RADIATION at 263 nm from the aperture in the front of the laser head. INVISIBLE LASER RADIATION at 1053 nm, 804-810 nm and VISIBLE at 527 nm may also be present.

DANGER!

Class IIIb INVISIBLE LASER RADIATION at 1053 nm is emitted from the aperture on the right side of the laser head, if open. **Class IIIb VISIBLE LASER RADIATION** at 527 nm is emitted from the aperture on the right side of the laser head, if open.

DANGER!

Class IV invisible laser radiation at the wavelength 808 nm emits from the receptacle 2 on PSU and from fiber patchcord if not plugged-in to LH!

It is prohibited to connect low-voltage power cable and/or AC/DC adapter power cable to your power supply until both fiber patchcord connectors are plugged-in to their receptacles and fixed with nuts!

This product complies with 21 CFR 1040.10 and 1040.11 expect for deviations pursuant to Laser Notice №50, dated June 24, 2007.

1. Provide access to the laser to qualified users only who are laser safety trained and aware of possible hazard. It is good practice to operate the laser in the room with controlled and restricted access.
2. The workplace should be organized in such a way so that not to affect the staff by laser radiation.
3. Avoid direct, reflected or scattered exposure to eyes. Never look directly into the laser light source or at reflected laser light from any reflective surface.

WARNING! It is prohibited to look into output and side apertures of the laser head!

4. Maintain experimental setups at low height to prevent inadvertent beam-eye encounter at eye level.
5. Extreme caution should be exercised when using solvents in the area of the laser.
6. To prevent accidental contact with eyes reflected or scattered laser radiation should use protective eyewear for the wavelength 263 nm.

When utilizing emission at 1053 and 527 nm, use appropriate protective eyewear.

7. Use the laser in an enclosed room. Laser beam remains collimated over long distances and therefore presents a potential hazard if not confined.

8. Place warning signs in the area of the laser beam to alert laser radiation present.

Laser radiation at 263 nm is emitted from the output aperture (Fig. 1) on the front panel of the laser head.

WARNING! Avoid Eye or Skin exposure to direct radiation. Direct eye contact with the output beam from the laser will cause serious damage and possible blindness. Laser beams can ignite volatile substances such as alcohol, gasoline, ether and other solvents, and can damage light-sensitive elements in video cameras, photomultipliers and photodiodes. Reflected beams may also cause damage. For these reasons, observe all safety precautions in this instruction manual.

9. Avoid reflected laser light or light of other laser sources to enter into LH through output window. This may cause random changing of laser beam parameters and/or damage to the optical elements of LH. This will not be considered as a warranty case.

Refer to Fig.1, Fig.2 and Fig.3 on following pages for the location and description of safety labels.

For remote locking of the laser, pins ## 6 and 1 of Control connector plug are intended. Description of control connector is given in Table 2.

Please note that cords and fiber patchcord laying must provide no jamming!

To protect the equipment when lightings or power surges can occur, unplug the laser from the main power supply. This will help to prevent damages to the laser.

Warning! The socket outlet used to connect the AC adapter should be grounded properly. Do not use an ungrounded line!

4 SPECIFICATIONS

Wavelength	263 nm
Max. Average Pulse Energy at 1 kHz at 263 nm.....	> 25 μ J
(Output of 1053 nm (about 200 μ J@ 1 kHz) together with 527 nm (about 10 μ J@ 1 kHz) is provided at the side of the laser head)	
Max. Peak Power @ 1 kHz	>6 kW
Mode of Operation.....	Q-switched, ext./int. triggering/through RS-232
Range of Pulse Repetition Rate:	
Ext. Triggering ¹	single pulse - 4 kHz
Int. Triggering: through RS-232 ²	0.01 - 4 kHz
without PC ³	1 \pm 0.01 kHz
Pulse Duration (1 kHz, Average Pulse Energy > 20 μ J, FWHM)	<4 ns
Pulse-to-Pulse Stability – StdDev/Mean (1 kHz, Average Pulse Energy> 20 μ J).....	< 15 %
Long-term stability (Av. Power (RMS)/Av. Power, at 1 kHz, Average Power > 0.02 W, within 8 hours)	< 2 %
Beam Profile.....	TEM ₀₀
Beam Height.....	21.5 \pm 0.5 mm
Beam Diameter (1/e ² , at output aperture).....	1.5 \pm 0.3 mm
Beam Divergence (full angle, 1/e ²).....	< 1 mrad
Beam Quality, M ²	< 1.2
Polarization Linearity	> 100:1, vertical (< 5°)
Laser Trigger to Sync Out Pulse ⁴ (at 1kHz, Average Pulse Energy > 20 μ J)	
Delay (the value is within the range).....	300 \pm 250 ns
Jitter	< 8 ns
Laser Emission to Sync Out Pulse ⁴ (at 1kHz, Average Pulse Energy > 20 μ J)	
Delay	< 50 ns
Jitter	< 2 ns
Operating Temp/Humidity Range.....	+15 to + 35 °C /up to 80% non-condensing
Shipping Temp/Humidity Range(In the manufacturer package)	-20 to +50 °C / up to 80% humidity at 25 °C
Dimensions (L x H x W):	
Laser Head (without connectors)	215 x 40 x 70 mm
Power Supply (without plug-in units).....	170 x 95 x 232 mm
Fiber Cable Length.....	1.5 \pm 5% m
Minimal long term bending radius of fiber cable.....	50 mm
LH-PC cable Length	1.5 \pm 5% m
Weight:	
Laser Head	< 1.3 kg
Power Supply	< 4.5 kg
Operating Voltage	24 \pm 10% V DC
Max. Current Consumption	< 5 A
Max. Power Consumption	<120 W
Typical Power Consumption.....	<70 W
Warm-up Time.....	< 10 min
Remote Control of Laser Parameters	
(ON/OFF, Ext./Int. Triggering, pulse repetition rate, pulse energy)	via interface RS-232
Data rate via Interface RS-232.....	4800 bit/s
Laser Class	IV
Compliance	CE, RoHS

¹ Triggering with external electric pulse generator; generator is not included in delivery set.

² Generation of periodical laser pulses using PC, step 0.01 kHz. Average energy may be changed by software from 2.5 μ J up to maximum value.

³ Generation of periodical laser pulses at 1 kHz rep. rate; external generator and/or PC are not required.

⁴ Sync Out signal is generated by pulse of laser light.

AC-DC adapter and power cord for AC/DC adapter is included in the delivery set.

5 PACKAGE CONTENTS

The delivery set consists of:

1. Laser head – 1 pc.
2. Power supply unit – 1 pc.
3. Signal cord – 1 pc.
4. Fiber patchcord – 1 pc.
5. Cord for connection with PC – 1 pc.
6. USB-RS232 converter – 1 pc.
7. Control connector plug – 1 pc.
8. Low voltage power cord -1 pc.
9. AC/DC adapter – 1 pc.*
10. AC/DC adapter power cord – 1 pc.*
11. CD with PC Software (not shown). (By agreement with the customer software can be e-mailed) – 1 pc.
12. Instruction Manual – 1 pc.

* on request

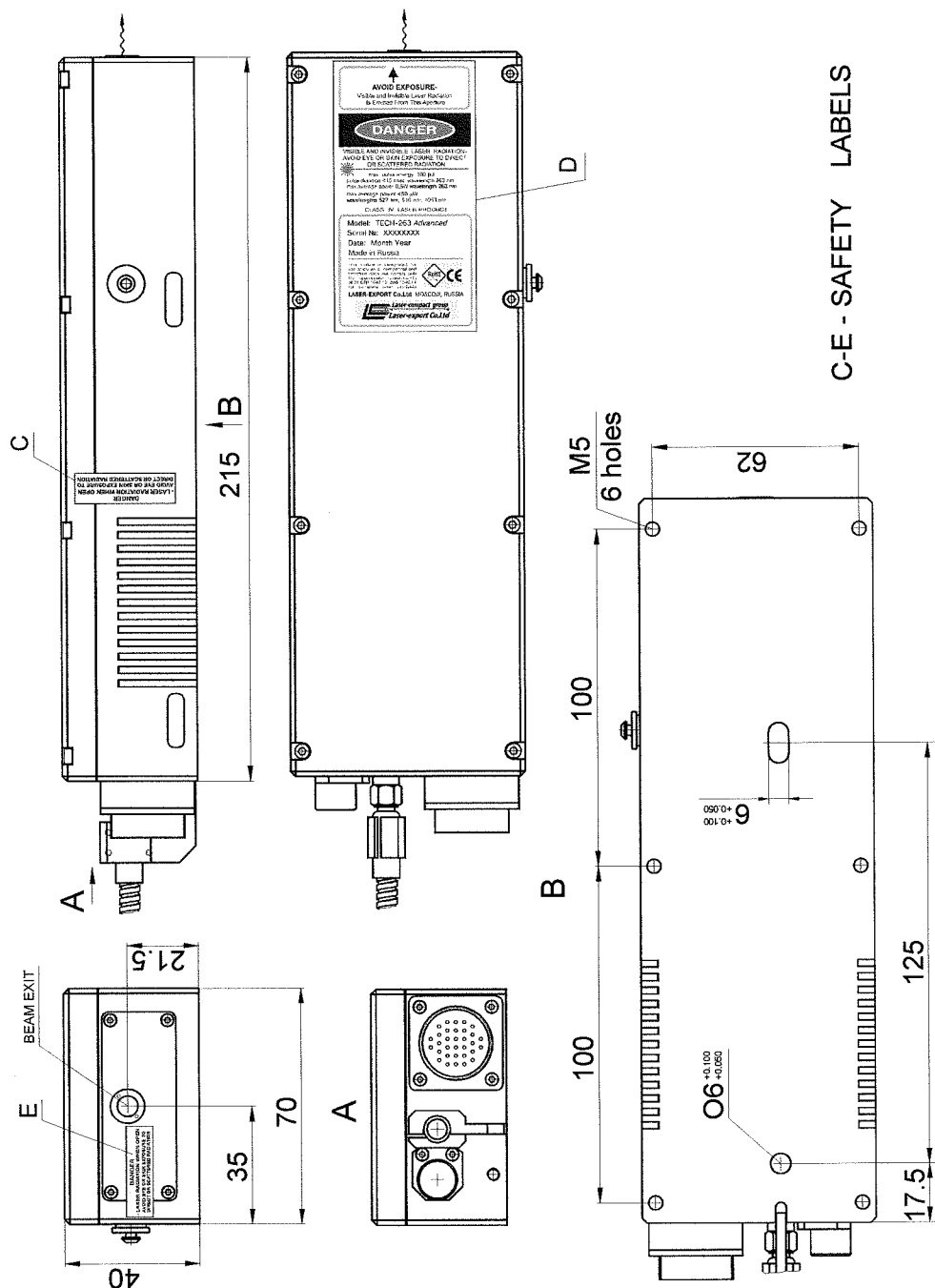


Fig.1 Laser Head

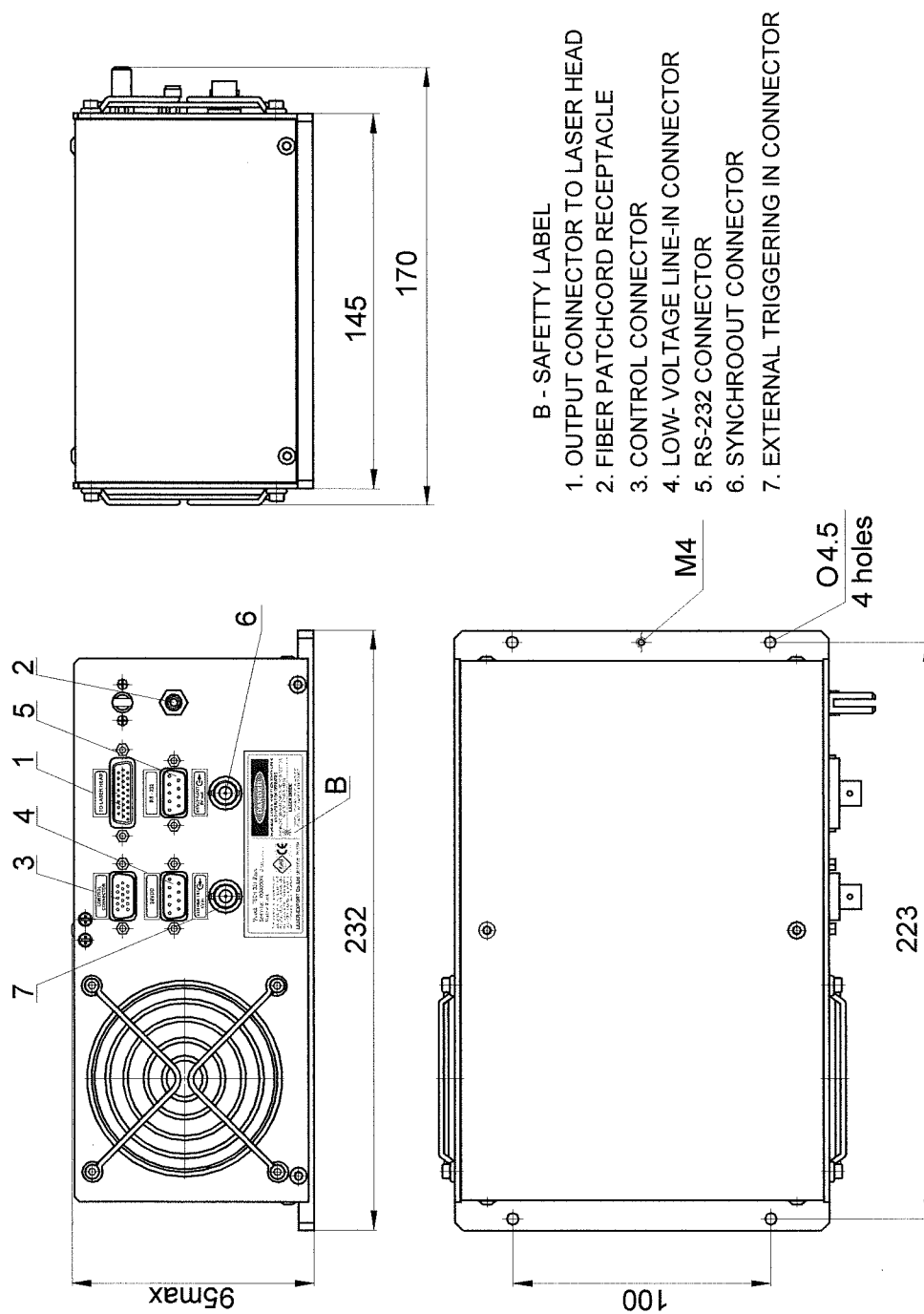


Fig.2. Power Supply Unit

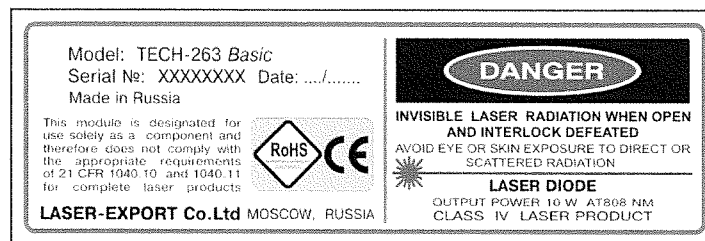
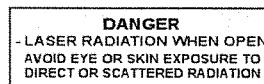
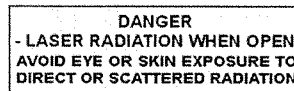
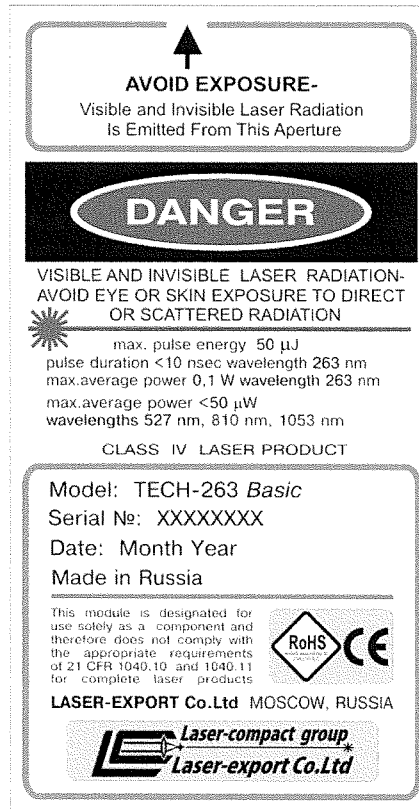


Fig.3. Description of warning labels on Fig.1 and Fig.2

6 INSTALLATION & OPERATION

Warning! Before getting started with the laser, please, get acquainted with all the safety precautions and safety requirements, described in the manual (see above).

6.1 General requirements

6.1.1 To use all features of the product, a PC with RS-232 or USB port is required.

To connect the laser to PC, use the cord for connection to PC, or USB-RS232 adapter, included into delivery set. See also command communication protocol on Page 21.

The delivery set includes software Lc300 (see Appendix to the Instruction Manual) to work with PC running under Windows 2000, Windows XP SP2, Windows Vista or Windows 7.

6.1.2 The laser can operate without PC and without outward pulse generator. In this mode the pulse repetition rate (PRR) is 1 ± 0.01 kHz.

6.1.3 The laser can operate without PC with outward pulse generator (not supplied). In this mode, PRR is set by outward pulse generator, and the value of average pulse energy decreases when PRR increases.

6.1.4 The laser is on only when the remote "Interlock" loop is closed (pins #6 and #1 are connected – factory set). If Control connector plug is removed while the laser is on, the power supply unit (PSU) will automatically shutdown the laser. In order to reactivate the laser, insert Control connector plug, then unplug the laser from electrical line and plug it in again not earlier than in 10 seconds.

6.2 Requirements to LH and PSU heat dissipation

A few precautions against laser head (LH) and PSU overheating should be taken to meet the Basications and keep warranty valid.

6.2.1 The heat generated in LH is dissipated through its metal base mainly, the heat in PSU is taken off by the built-in fan heatsink.

6.2.2 The typical level of LH heat generation is ~25 W. The LH has to be mounted on a heat-conducting base (metal base) using 4 screw holes (M5) on LH bottom or 4 fillets on LH sides. **Important!** The heat-conducting base flatness must be better than 0.05 mm over mounting area.

The temperature of LH base should not exceed 35°C.

Note! Two stud holes on LH bottom are intended for precise positioning.

6.2.3 It is recommended to mount PSU on a heat-conducting base (metal base).

Note! Free air circulation must be provided in the place where PSU is mounted.

Warning!

In case of PSU overheating, protective circuit will switch the pumping off and switch it on again automatically as soon as PSU temperature decreases. Be careful!

6.3 Preparation to operation

6.3.1 Fix LH and PSU in the required position as Section 6.2 reads.

6.3.2 There is M3 screw hole on rear panel of LH. Use it to ground. Metal base on which PSU is placed should also be grounded properly.

6.3.3 Make sure that low-voltage power cord (or AC/DC adapter) is unplugged.

6.3.4 Plug-in low-voltage power cord (or AC/DC adapter cord) to low-voltage line-in connector on PSU, then fix it with screws.

Warning!

Do not connect low-voltage power cable (or AC/DC adapter power cable) to your power supply until all the requirements of the present Section are met!
This can lead to a failure of the laser system!

In case of low-voltage feeding, input voltage should be $24 \pm 10\%$ V. **Note!** Damage to laser may occur if exceeds or has spikes above 26 V!

6.3.5 Connect LH and PSU with signal cord (output connector (1) on PSU and connector on LH rear panel), and fix it.

6.3.6 Insert **Control connector plug "TECH-263"** into Control connector (3) on PSU.

Note! In case Control connector plug is not inserted, no laser emission will appear.

6.3.7 To operate the laser with PC, connect a cord for connection with PC to RS-232 connector (5) on PSU, fix it with screws. Connect it to COM or USB port (through USB-RS232 adapter attached) of your PC.

6.3.8 Make sure that both ends of fiber patchcord have protective caps – this ensures that both ends are not soiled.

Warning!

Fiber patchcord connectors and fiber receptacles are made with high accuracy.
Do not make great efforts when inserting and tightening nuts!

Warning!

It is prohibited to use mechanical accessories (spanner, etc.) for tightening fiber patchcord nut!
Failure occurs if used!

6.3.9 Plug-in the blacked keyed end of fiber patchcord to the receptacle (2) on PSU.

Do the following:

- Just before the plugging-in, remove the dust cap from receptacle (2) on PSU (save the cap in a clean place)
- Unscrew the cap of appropriate fiber patchcord connector (save the cap in a clean place). For this hold the nut. Do not touch the ferrule!
- Holding the fiber patchcord connector, provide the key to match the "keyhole" on PSU and then insert the connector into receptacle carefully and screw the nut by fingers and tighten it slightly.

6.3.10 Plug-in the metal-plated keyed end of fiber patchcord to the receptacle on LH rear panel.

Do the following:

- Just before the plugging-in, remove the dust cap from receptacle on LH rear panel (save the cap in a clean place)
- Unscrew the cap of appropriate fiber patchcord connector (save the cap in a clean place). For this hold the nut. Do not touch the ferrule!
- Holding the fiber patchcord connector, provide the key to match the "keyhole" on LH base and then insert the connector into receptacle carefully and screw the nut by fingers and tighten it slightly.

Note! Provide bending radius not less than specified! Failure may occur if less.
Larger value of bending radius may lead to even better performance of the laser.

6.3.11 The laser is ready to operation.

6.4 Turning the laser on and mode of operation of laser

Warning!

DANGER!

Class IV invisible laser radiation with wavelength 808 nm emits from the receptacle 2 on PSU and from fiber patchcord if not plugged-in to LH!

It is prohibited to connect low-voltage power cable and/or AC/DC adapter power cable to your power supply until both fiber patchcord connectors are inserted into their receptacles and fixed with nuts!

6.4.1 To turn the laser on connect low-voltage power cord (or AC/DC adapter power cord) to your power supply.

6.4.2 Indicator 7 will blink green (if connected) until the laser is ready. As soon as the laser is ready (typically 1.5-2 min), indicator 7 becomes yellow, indicator 6 is on red (if connected), and laser emission appears (typically in 1 min) and further gradually increases to the set value.

6.4.3 To utilize emission at 1053 and 527 nm, which are in a single beam, unscrew protective cap on LH right side. Note, that the laser will continue to emit the main wavelength, 263 nm. Parameters of emission at 1053 and 527 nm will be changed when parameters of main emission at 263 nm are changed.

General information

There are three main mode of operation:

- 1) Self-run mode,
- 2) External triggering mode (with outward pulse generator),
- 3) PC mode.

6.4.3 Self-run mode of operation (without PC and without outward generator)

Laser can operate without PC and without outward generator. PRR is constant (1 kHz). Pulse energy is at maximum value only. To enable starting of emission, pins #11, #6 and #1 of Control connector plug must be short-circuited (factory set).

6.4.4 External triggering mode without PC (with outward generator)

In order to operate the laser in this mode, an outward generator is needed. Please find the requirements to the Triggering signal in the Table 1.

- For operation in this mode pin #11 of the Control connector plug should be disconnected from other pins (it is allowed to use soldering for this).

- Set the following parameters of triggering signal:

- polarity: positive;
- amplitude: $5 \pm 0,5$ V;
- pulse duration: ≥ 1 μ s;
- rise time: ≤ 100 ns.

- Connect outward generator to "External Trigger" BNC socket (7) on PSU

6.4.5 PC mode (operation via RS-232 interface)

- Before operation in this mode install the supplied software Lcc300 (See Appendix to Instruction Manual).

- Do p.6.3.7.

Note! In case supplied USB-RS232 adapter is used, you will probably need to install drivers first.

- Connect the COM port of your PC with RS-232 connector (5) on PSU using the supplied COM cord for connection with PC.
- Turn the laser on.
- Run the software (see Appendix to Instruction Manual).

7 PSU FRONT PANEL

At the front panel of PSU (Fig.2) there are:

- 1) Output connector to LH (position 1).

This is the connector, through which PSU is connected to LH by signal cord.

- 2) Fiber patchcord receptacle (position 2).

This is the receptacle, through which pumping emission is transferred to LH when fiber patchcord is inserted.

- 3) Control connector (position 3).

The control connector is used to switch between internal and external triggering modes, when operating without PC. Switching modes is performed by connecting or disconnecting of definite pins of Control connector (for full description see Table 2).

Note! Laser operates when pins # 6 and # 1 ("Interlock") are connected (factory set).

- 4) Low-voltage line-in connector (position 4)

The connector is intended for feeding from 24 V power source.

- 5) RS-232 connector (position 5)

This connector enables operation in a PC mode.

- 6) BNC- synchro.out connector (position 6).

Output synchro signal BNC connector provides an electric signal with its rise edge synchronized with laser light pulse. It may work unstable if output pulse energy is less than approximately 1/3 of max value. Sync. out signal is formed by output laser light pulse.

Requirements to the parameters of the triggering and synchronizing signals are shown in Table 1.

- 7) External triggering BNC connector (position 7).

This BNC-connector is intended to accept pulses from an outward generator for operation in external triggering mode.

8 TROUBLESHOOTING GUIDE

Below it can be found a troubleshooting guide that highlights several possible problem situations. These problems may be solved by a customer and should not be addressed to Laser-Export Co. Ltd.

Event	Indicators (if connected)		Possible cause and recommendation
	Indicator 6	Indicator 7	
No laser emission	No light	No light	a) The power cord is unplugged. Rec.: plug the power cord. b) i) Low input AC voltage - Line voltage is below 90 V, ii) Input DC overvoltage (>26 VDC) or undervoltage (<20 VDC) Rec.: Check the voltage.
No laser emission	Red	Orange	Initial setting setup is Minimum Rec.: Change the start setup (see Appendix).
Laser generation stop	No light	Orange blinking	PSU overheating Rec.: Provide sufficient heat dissipation to PSU.

9 OPERATING AND STORAGE REQUIREMENTS

- Do not place laser in dusty or humid place.
- Do not shock or shake laser.
- Keep the laser in a heated and ventilated warehouse.

10 WARRANTY

Manufactory warrants that the laser Model TECH-263 to be free from defects for twelve months from the date of shipment. If it is found defect during the warranty period, the product will either be repaired or replaced. This warranty does not apply to defects resulting from modification or misuse of the laser.

To return Model TECH-263 for repair, Laser-Export packing box should be used. Otherwise the laser can have been damaged during shipment.

11 APPENDIX

Table 1. Triggering and sync signals

EXT.TRIG (Input)	$5 \pm 0,5$ V positive polarity input AC impedance 1 kOhms $\tau_{rise} < 100$ ns
SYNCHR.OUT (Output)	$5 \pm 0,5$ V (50 Ohms load) positive polarity $\tau_{pulse} = 2,5 \mu s \pm 30\%$ Output impedance - 50 Ohms $\tau_{rise} \approx 5$ ns.

Sync. Out signal is formed by output laser optical pulse. It may work unstable if output pulse energy is less than approximately 0,3 max value at max. pumping of appropriate frequency.

Table 2. Description of Control connector

Pin No	Description	Note
1	Signal GND	
2	Indicator 6	Connected to LED in PSU
3	Not used	Do not connect
4	Indicator 7 (Green)	Connected to LED in PSU
5	Not used	Do not connect
6	Interlock	Laser ON – if connected to Signal GND #6 (or <1VDC)
7	Signal GND	
8	Not used	Do not connect
9	Not used	Do not connect
10	Not used	Do not connect
11	Ext./Int. Trig. Switch	Internal – if connected with Signal GND #11 (or <1B)
12	Laser energy monitor	
13	Indicator 7 (Red)	Connected to LED in PSU
14	Not used	Do not connect
15	Not used	Do not connect

Table 3. Status indicators description (if connected)

Pin №	System status	Indicator 6	Indicator 7
1	Preparing to operation	No light	Green blinking
2	Pumping ON, normal operation	Red	Orange
3	Input DC overvoltage (>26 VDC) or undervoltage (<20 VDC)	No light	No light
4	No input voltage, wrong input voltage polarity connection	No light	No light
7	Control connector pins ## 6 and 1 are disconnected	No light	Green-orange blinking

Appendix to the Instruction Manual

Lcc 300 Software instruction.

1 Product Description

The software is intended to control the laser parameters with PC interface RS-232 using OS Windows 2000, Windows XP, Windows Vista or Windows 7. The software may record and read initial (starting) settings into EEPROM memory and provides changing both PRR and laser pulse energy.

2 Lcc300 Installation

In order to install the program, run file Lcc300.EXE. Installation of this program is automatic. During the installation the information windows open and user has an opportunity to cancel the installation or to change installation folder. The installation wizard will ask to confirm several steps, and you can do it by pressing NEXT-NEXT - NEXT – FINISH. Lcc300 icon will appear on Desktop.

3 Operation with software.

3.1 Run the program

Before running Lcc300, all programs and applications which use the COM port intended for use with the laser, must be closed.

The following-like window appears after the program run (fig.1)

Note! Screenshots below are shown as examples.

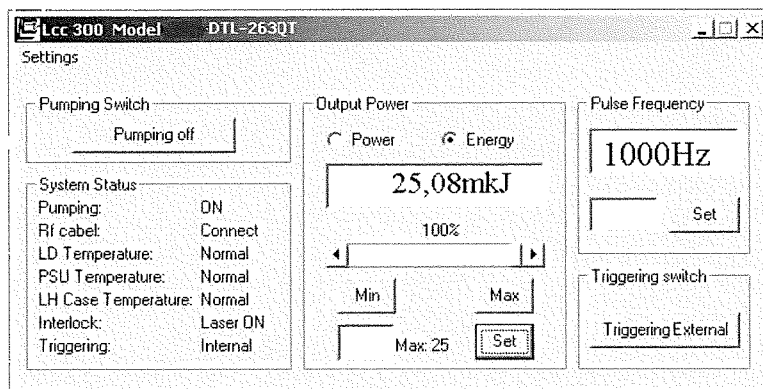


Fig. 1

In case of the program has been launched when the laser is turned off or connected to another COM port except for COM1, it is necessary to choose the required COM port (usually COM1 or COM2) from cascading menu <setting> <Port setup> (see fig.2 and 3).

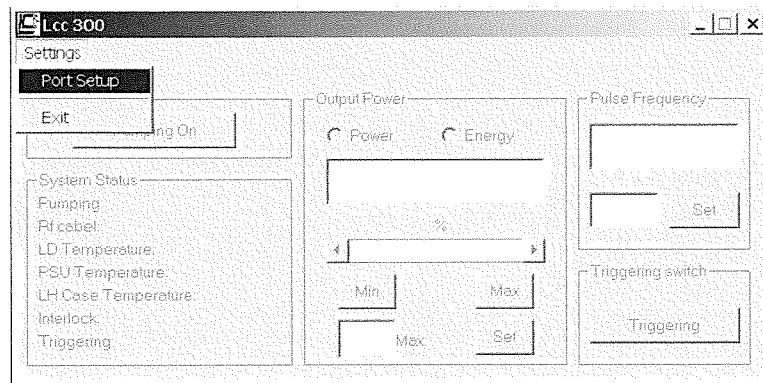


Fig. 2

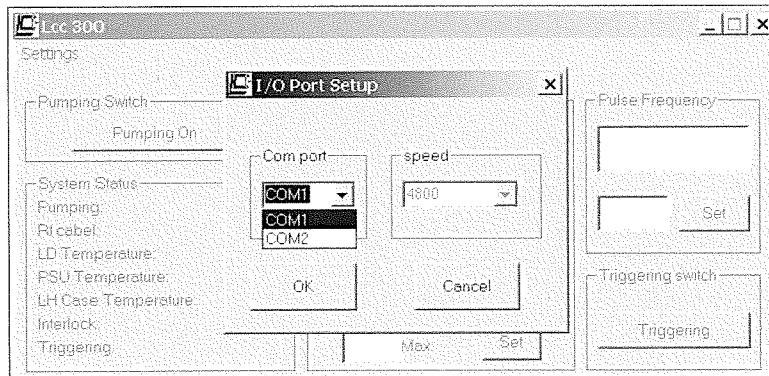


Fig. 3

If the laser is turned on (or connected) with the appropriate COM port the program window becomes active automatically.

If connection between the laser and PC is interrupted by any causes the program window becomes inactive. In this case the procedure of COM port choice has to be repeated.

3.2 Control of Laser parameters

General view of the laser control panel is in fig.4.

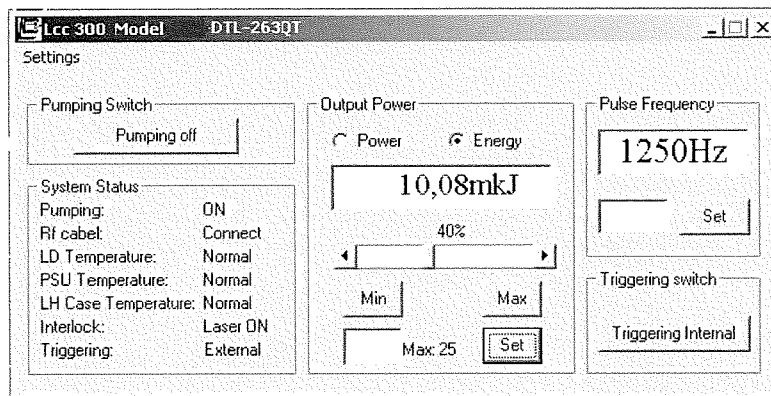


Fig. 4

The frame **< System Status >** consists of status information concerning of Pumping, RF cord contact (not used), LD Temperature, PSU Temperature, LH Case Temperature, Interlock and Ext./Int. Triggering.

The frame **<Pulse Frequency >**

In the upper part of the frame the current prr is shown of internal triggering. To change PRR, set the new value in accordance with the Specifications into edit box (on the left of **<Set>** button). After **<Set>** button is clicked, new data are written into PSU. The new value of PRR read from PSU will be shown in the "Pulse frequency" box.

The frame **<Output Power>**

In the upper part of the frame pulse energy measured with internal energy meter (or recalculated power value: energy multiplied by PRR indicated in the neighbor frame) is shown. There are 3 ways to change pulse energy:

- With a slider in the range of 0-100%,
- By setting a new value in the range of 0-Max. (this value is shown near the box) in the edit box on the left of the **<Set>** button,
- By clicking **<Min>** or **<Max>** button.

Attention! Values of output average power and energy indicated on PC display using Lcc300 software are not precision. Use calibrated external measuring equipment intended for such a purpose for precision measurements.

The frame **<Triggering switch >**

Here you will find the button to switch between the Internal *<Triggering Internal>* and External *<Triggering External>* mode.

Communication protocol instructions

No	First transmitted byte from PC to MK	Second transmitted byte from PC to MK	Second accepted byte from PC to MK	Command description	Note
1	0x80 (10000000 bin)	WWWWWWWW		Set new power value of current switch-on. Not saved in MK EEPROM.	Control of laser energy (0...255)
2	0x83 (1000 0011 bin)	XXXX NNNN		Record variables of laser switch-on modes. Lower bit : Pumping switch-on control. Lower bit: 0-pumping switch-off or 1- pumping switch-on.	2)*
3	0x05 (0000 0101 bin)		XXXX NNNN	Accept laser switch-on mode variables.	
4	0x02 (0000 0010 bin)		0000 00NN	Accept pumping unit temperature status: 1 – normal, 2 and 3 –non normal	
5	0x03 (0000 0011 bin)		0000 00NN	Accept laser head base temperature status: 1 – normal, 2 and 3 –non normal	
6	0x08 (0000 1000 bin)		HHHH HHHH	Accept upper byte of average photocurrent readings.	
7	0x09 (0000 1001 bin)		LLLL LLLL	Accept lower byte of average photocurrent readings.	
8	0x97 (1001 0111 bin)	HHHH HHHH		Set upper byte of frequency divided by 10.	Internal triggering frequency control
9	0x98 (1001 1000 bin)	LLLL LLLL		Set lower byte of frequency divided by 10. Set new frequency value.	Internal triggering frequency control
10	0x9E (1001 1110 bin)	0000 000N		Record triggering mode (INT/EXT) N="0" – INT N="1" – EXT	2)*
11	0x1E (0001 1110 bin)		0000 000N	Accept triggering mode (INT/EXT) N="0" – INT N="1" – EXT	2)*
12	0x 1F (0001 1111 bin)		0000 000N	PSU temperature status (01 – normal, 00 - overheating).	
13	0x 1D (00011101 bin)		0000 000N	It used for RF cord connection checking. 00 – OK, 01 – bad connection.	

DTR 4800 bit/s, 8 bits, no parity bit, single stop-bit.

In order to have a possibility to operate the laser without PC the starting settings (see below) are incorporated into the software.

After the turning laser on, the starting pumping settings are read from the low-order bit of 00 EEPROM cell ("pumping on" or "pumping off"). The data recording into this cell are performed by the command "0x83 0xXX". So, if, for example, "pumping off" is recorded (programmed) then the laser will not emit without PC.

The pulse laser energy extreme values (max. or min.) are set according to the 1-st and 2-nd bits.

This value is the default energy value after the laser turning on.

1) Description of the second byte of the command "0x83".

0 bit – (low-order bit) – "1" – pumping on; "0" – pumping off (with PC operation)

1 bit – after turning laser on only: - "1" – pumping on; "0" – pumping off (without PC operation)

Pulse energy value after the laser turning on:

	Min	Max
2 bit –	"0"	"1"

3...7 bits – "0" - they don't use in the laser.

2) When pins ## 11 and 1 of Control connector are closed (preinstalled status of the pins) the microcontroller program can switch the pulse trigger source (INT/EXT). And if these pins are disconnected the program has to operate at external triggering mode only.

Note - Lcc300 program changes settings of 00 EEPROM cell to "0x07" automatically!
This command corresponds to "turning laser on and set max. pulse energy value".

12 TEST REPORT

Laser TECH-263 Basic

Serial Numbers:

1) Power supply: No 32000566
2) Laser head: No 32000566
Pulse energy, 263 nm at 1 kHz 31 μJ
Line Voltage: 24 \pm 10 % V

Laser proved to be suitable for operation

Date april 2014

Name Иважиди

Manufacturer Stamp



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