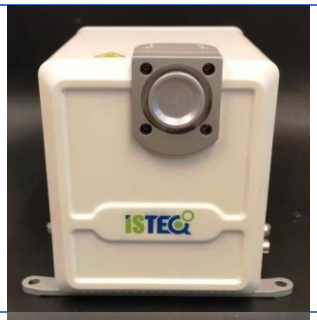
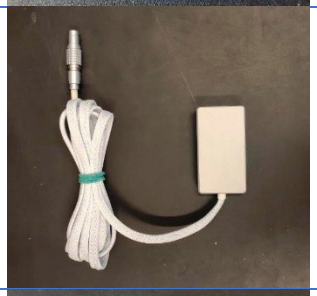
BROADBAND PLASMA LIGHT SOURCE XWS-30

Operation and safety manual

Contents

1. Content of the system

ISTEQ broadband plasma light source XWS-30 system includes:

XWS-30 Optical head, x1	
Power supply unit (PSU) , x1	
PSU power cable, x1	
Interlock, x1	
RS-485/USB converter + cable, x1	
PC - Converter USB cable, x1	
Purge fittings, x2	

After unpacking the system please check that there is no damage. If there is - contact the supplier.

2. Safety precautions

The XWS-30 laser plasma source uses a high-power laser light which is delivered by fiber and focused on plasma inside the light source head unit.

The plasma light source is very bright and can potentially cause damage to the eyes and skin if there is direct contact.

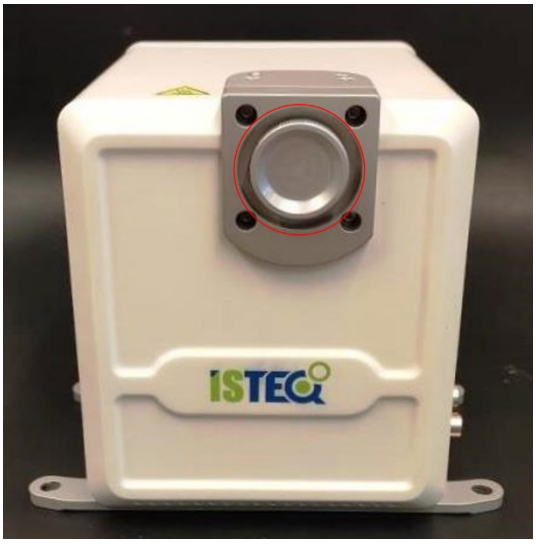
Exploitations restrictions:

- **DO NOT** open the light source head
- **DO NOT** touch the output window and the lamp bulb inside the light source head unit
- Operate the source in faculties with ambient temperature below 30°C
- Do not restrict air convection of the Optical head. Minimum distant to the nearest obstacles:
  - From source head back: 20cm
  - From source front panel: 10cm
- Light source head module gets HOT (up to 60°C under normal conditions during the first 45 minutes of continuous operation)

For your own protection and safety:

- Wear UV-protection glasses
- Take necessary precautions to avoid UV exposure
- Limit exposure to UV-generated ozone

3. Preparation for operation

1. Carefully unpack the delivered system and prepare for the operation:	
2. Remove the plastic/metal cap from the optical head output window/FCU:	
3. Connect the interlock (1), RS-485 cable (2) and the power cable (3) to the XWS-30 system:	
4. Connect the power cable to 220V plug	

5. Connect the RS-485/USB converter to your PC/Laptop via USB cable.	
6. The system is ready for operation	

4. LED indication and system control panel

LED indicators and control buttons are located on the side of the Optical head.

Buttons:

- ON/OFF button is used to switch ON and OFF the source
- START/STOP button is used to START and STOP the plasma

Indicators:

The indication system consists of five LEDs, two of those are integrated into the controlled buttons.

Turn ON the system pushing ON/OFF button one time, check the indication:

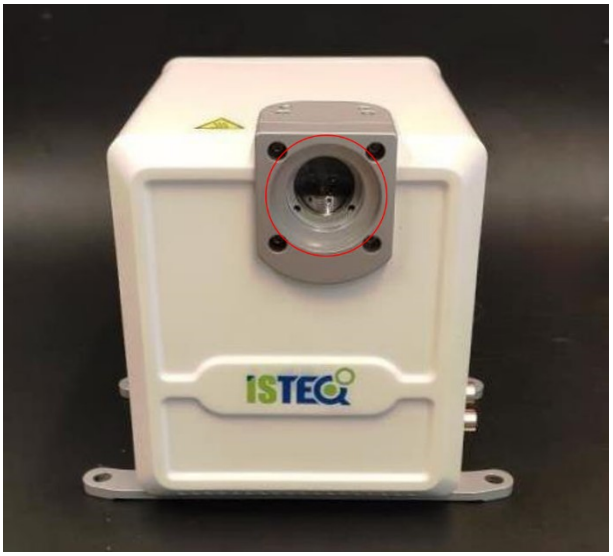
READY LED	
No light	The system is not ready for the operation
GREEN light	The system is ready for operation
TEMP LED	
No light	Temperature control system is switched OFF and there is no internal error

RED light	Temperature control system is switched OFF and there is an internal error (In that case contact your supplier)
GREEN blinking light	Temperature control system is active and it is adjusting the laser temperature
GREEN light	Temperature of the laser is stabilized
LASER LED	
No light	The laser is switched OFF
RED light	The laser is switched OFF or there is an internal error
GREEN light	The laser is switched ON
ON/OFF LED/button	
No light	The system is powered OFF
GREEN light	The system is power ON
START/STOP LED/button	
No light	The plasma is switched OFF
GREEN blinking	Plasma ignition is ON
GREEN light	Plasma is ON

5. System start and normal operational check-list

When the system is prepared for the operation do the following:

1. Connect the interlock (1), RS-485 cable(2) [Optional] and the power cable (3) to the XWS-30 system:	
2. Connect the power cable to 220V plug	
3. Push ON/OFF button one time. Check that: - ON/OFF LED is green - READY LED is green - TEMP LED is green	

4. Check there is no protection cap on the output flange:	
5. Start the plasma pushing START/STOP button. Check that: - Plasma light is produced - TEMP LED is Green - There is no RED LED on the indication panel	

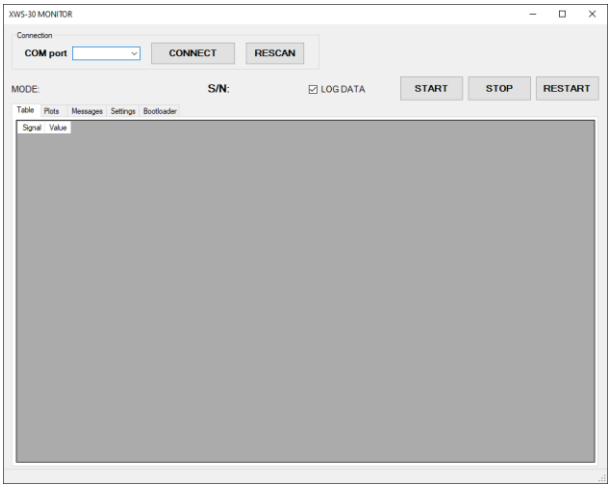
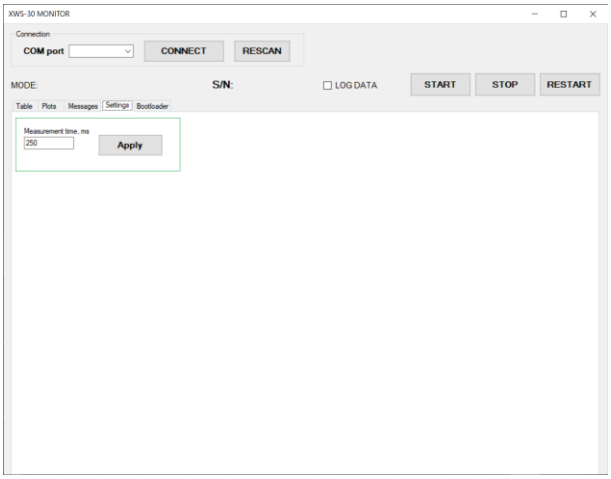
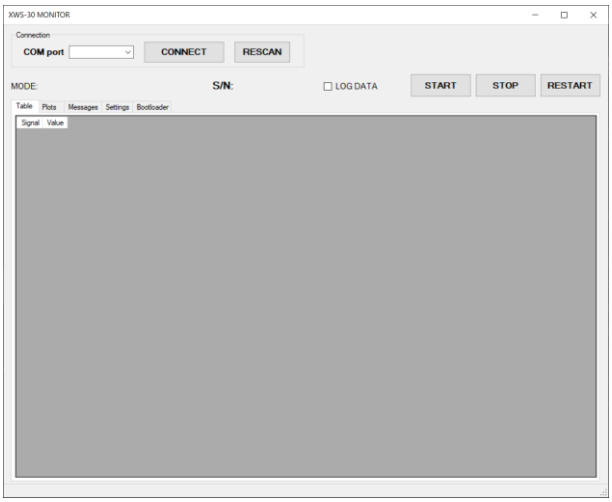
6. System remote control via XWS-Monitor

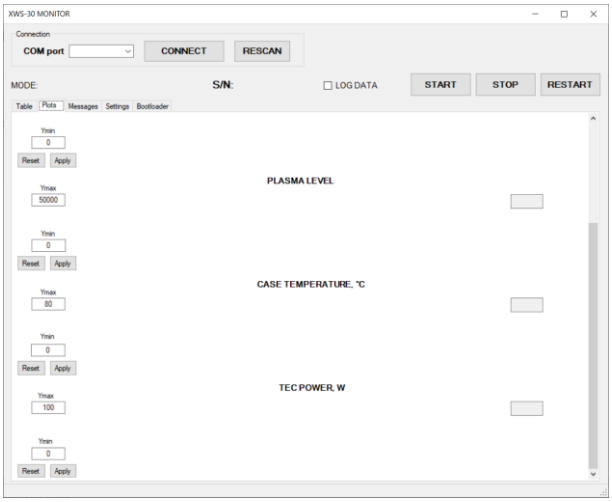
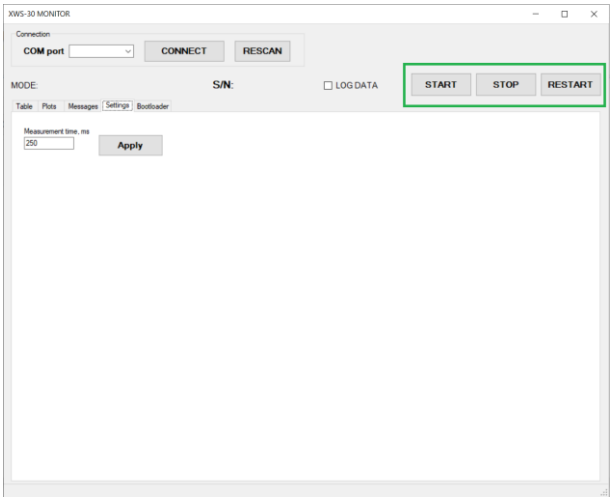
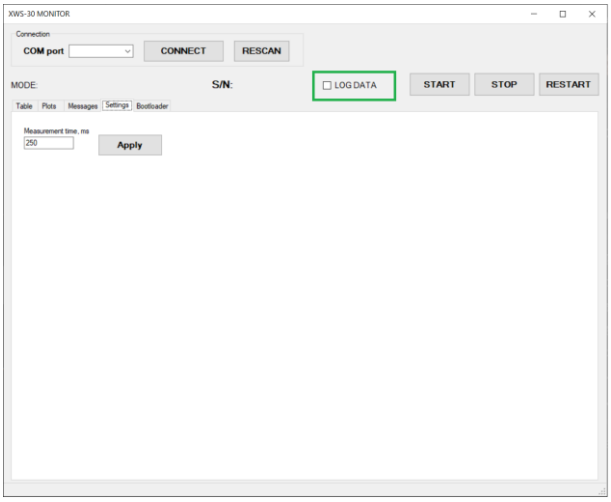
XWS-Monitor is a special software which allows to:

- Remotely control the system
- Turn the plasma ON and OFF
- Check the system parameters online
- Log internal system parameters in a log file

To get the latest version of the «XWS-Monitor» software please contract our supplier or ISTEQ directly.

1. Connect the interlock (1), RS-485 cable (2) and the power cable (3) to the XWS-30 system:	
2. Connect the power cable to 220V plug.	
3. Contact your supplier to get the latest version of **"XWS-30 Monitor"** software.	
4. Turn ON the XWS-30 source and start "XWS-30 Monitor" software.	

5. Click RESCAN button, choose the available COM port. Click CONNECT button. If the system is now connected you will send the system Serial number next to S/N:	
6. Go to SETTINGS tab. Choose the measurement time, which can be anything down to 200ms. Click APPLY	
7. TABLE tab. Here you can monitor the system parameters in real time:	

8. Plots tab Here you can see in real time the following graphs: - Laser temperature, *C - Laser current, A - Plasma Photodiode level, mV - Head case temperature, *C - TEC (laser cooling system temperature), *C	
9. Use START, STOP and RESTART buttons to start, stop the plasma or to restart the system:	
10. Click LOG if you want the system parameters to be automatically saved in .txt file in the root folder of XWS-Monitor	

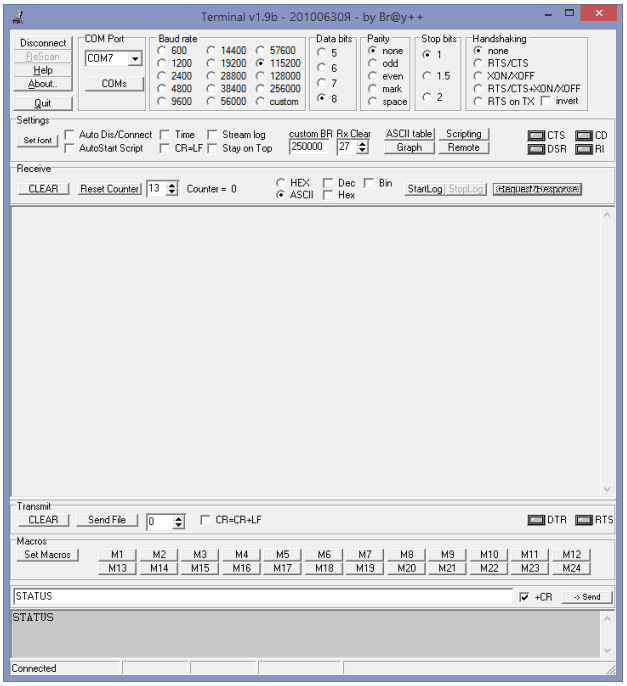
List of system parameters can be seen via XWS-30 Monitor:

Parameter	Meaning	Normal value
Serial #	Serial number of the system	XXXX
Firmware version	Firmware version of the PSU control PCB	1.11 or higher
Uptime	Total Uptime of the system, hh:mm	NA
Power On Time	Time of the current system session, hh:mm:ss	NA
Laser temperature	Temperature of the laser, °C	25±0.1°C
Head temperature	Temperature of the Optical Head	15°C < Th < 80°C
TEC current	Laser Cooling system: TEC element current	<8A
TEC voltage	Laser Cooling system: TEC element voltage	<15V
FAN Speed	Laser Cooing system: FAN rotation speed	<100%
Laser current	Current of the drive laser	10±0.1A or 11±0.1A (depending on the system configuration)
Laser voltage	Voltage of the drive laser	<5V

7. Control via RS terminal

That is possible to control the XWS-30 light source using RS-485 protocol.

Next steps to be taken:

1. Connect your PC/Laptop to XWS-30 system using RS-485/USB connector:	
2. It is up to the customer – to decide which software to be used for the RS communication As an option – Free Software "Terminal"	
3. Serial port settings: 115200 8-N-1	
4. Choose the COM-port and click *Connect*	
5. Send commands from the list below to receive the information about the system. NOTE: That is also possible to START and PLASMA remotely using RS protocol. See the commands description below	

Command list and comments are shown in the table below:

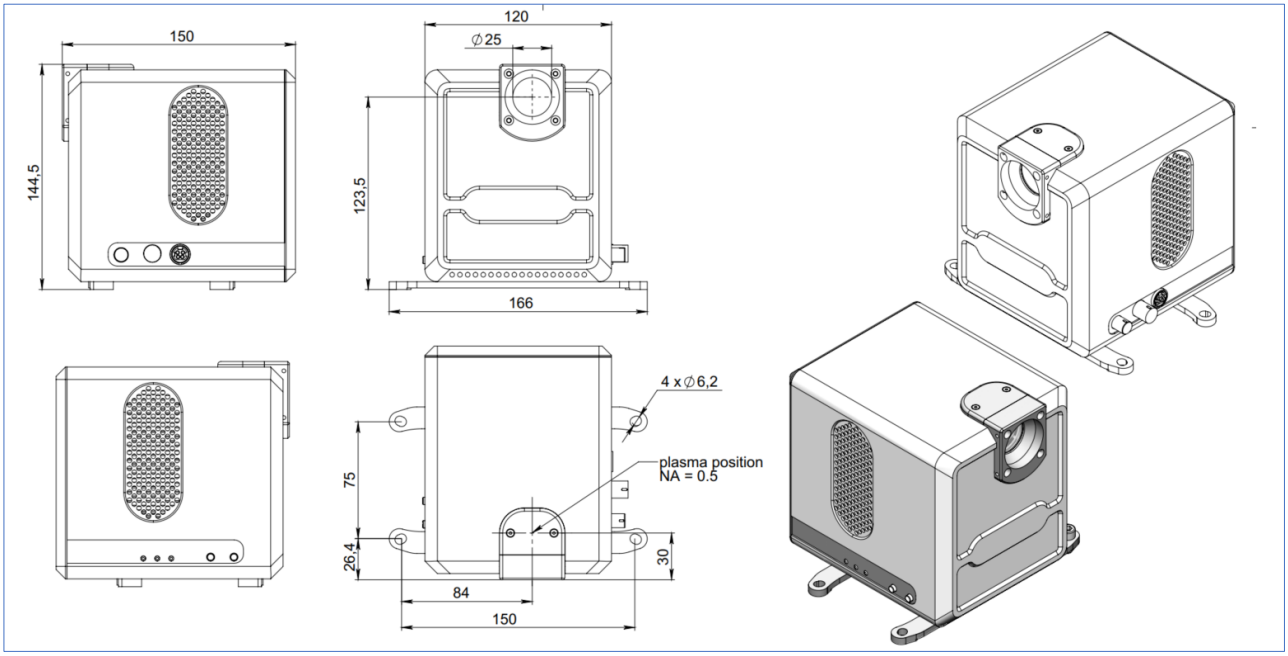
Command	Response
STATUS	STATUS=x where 'x' is system mode: x = 0 – IDLE (ready for operations) x = 1 – STARTING (Laser is starting) x = 2 – IGNITION (Plasma is triggered) x = 3 – PLASMA ON (Plasma is turned ON) x = 4 – ERROR
REPORT	The system gives the list of source internal parameters
ERROR	ERROR=xxxxx Allows to know error flags if STATUS == 4 0000000 means NO ERROR
SERIAL	SERIAL=xxxx where 'xxxx' is the system serial number shown as 4-digit number
FIRMWARE	FIRMWARE=x.xx where 'x.xx' is controller firmware version
UPTIME	UPTIME=xxxx.x where 'xxxx.x' is total laser/plasma active time in hours
PWRONTIME	PWRONTIME=xxxx days xx hours xx minutes xx seconds where 'xxxx days xx hours xx minutes xx seconds' is time since the system was switched on
LASER_TEMP	LASER_TEMP=xx.xxxx where 'xx.xxxx' is laser module temperature , °C
HEAD_TEMP	HEAD_TEMP=xx.xxxx where 'xx.xxxx' is optical head temperature, °C
TEC_CUR1	TEC_CUR1=xx.xxxx where 'xx.xxxx' is TEC channel current in Amps
LASER_CUR	LASER_CUR=xx.xxxx where 'xx.xxxx' is laser current is Amps
LASER_VOL	LASER_VOL=xx.xxxx where 'xx.xxxx' is laser voltage in Volts
SUPPLY_VOL	SUPPLY_VOL=xx.xxxx where 'xx.xxxx' is system supply voltage in Volts
TURN_ON	TURN_ON=[WAIT|OK|ERROR] Turns plasma on & returns result of operation
TURN_OFF	TURN_OFF=[OK|ERROR] Turns plasma off & returns result of operation
LASER_STAT	LASER=[ON|OFF|ERROR]
PLASMA_STAT	PLASMA=[ON|OFF|ERROR]
RESTART	Restarts the system
POWEROFF	Powers OFF the system

8. Specifications and facility requirements

XWS-30 performance	
Spectral range	190 to 2500 nm (UV configuration), 250 to 2500 nm (Ozone-free configuration)
Spectral brightness (450-500 nm)	Up to 40mW/(mm^2×sr×nm)
Emitting body source dimensions	100×250µm
Lifetime	10,000 hours
Temporal and spatial stability	STD < 0.15%
Main parameters	
Light source dimensions	120x150x144.5mm
Output NA (by default)	0.4
External optic interface	C-mount
Pumping laser wavelength	NIR
Optional configurations:	
Source spectrum	UV or Ozone free
Light output	Free Space or Fiber coupled
Additional	
External control	COM-port (RS-485)
Interlock	LEMO FGG
Electricity requirements	
Voltage	110-220V±10%
Frequency	50Hz

9. XWS-30 source dimensions

Linear dimensions: 120x150x144.5mm



10. Software download

The XWS-30 software is available as download from

www.photonics4work.eu/Download/XwS30/XWS-30.exe

Latest version of this manual

www.photonics4work.eu/Download/XwS30/manual.pdf

11. ISTEQ contacts

If you have any questions regarding the XWS source – feel free to contact your supplier or ISTEQ directly:

Address: The Netherlands, Eindhoven, High Tech Campus 9, 5656AE

Website: www.isteq.nl

Phones: +3140-230-42-42 (Office), +316-2525-7382 (Mobile)

E-mail: info@isteq.nl

12. Photonics4Work contacts

For any commercial information or if you have any questions regarding the XWS source contact:

Address: The Netherlands, Zevenaar, 6903 PZ, Mercurion 28 A

Website: www.photonics4work.eu

Phones: +31 31 – 316 340804 (Office), +31 6 – 22 40 60 27 (mobile)

E-mail: contact@photonics4work.eu