Optilab TWL-P-HS User's Manual

High Speed Tunable Wavelength Laser – Phoenix Series

Caution: The user must read this manual before operating the SOA-M unit. Operations other than those described in this manual may result in personal injury and damage to the unit.

Note that any attempt to open or fix the equipment without prior approval by Optilab, LLC. voids the warranty.

Ver. 1.2
August 12th, 2021

Revision History

VERSION	DATE	SUMMARY
1.0	06/01/2019	Manual introduced
1.1	03/05/2020	Updated front page, Main menu photo, ITU Grid
1.2	08/12/2021	Format update

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Table of Contents

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1. General Information

1.1. Introduction

This manual contains information on the installation and operation of the TWL-P-HS High Speed Tunable Wavelength Laser demonstration purposes.

1.2. Product Overview

The TWL-P-HS is a high speed, innovative, all-in-one tunable and programmable laser source with high spectral purity. Based on laser crystal technology, the TWL-P-HS can operate in three distinct modes: CW mode, continuous scan mode, and programmable scan mode over the entire C-band range. It also features variable scan speed up to 4000 nm/s. Its lightweight and compact design allow it to be easily utilized both in laboratory and field engineering applications. A built-in 7" touchscreen with intuitive graphical interface gives the user full control over the operation of the device. In addition, the TWL-P-HS can be controlled via remote software through USB or Wi-Fi. Its polarization output and high wavelength and power stability make it a perfect solution for a seed laser for optical modulation and other test and measurement applications.

1.3. User Safety

1. The TWL-P-HS unit emits high intensity invisible light from the optical output receptacle. Avoid direct exposure to skin and eyes.

2. The user should never open the equipment case; any attempt will void the warranty and may result in electric shock and EMS attack to equipment in the vicinity. If requesting to open up the unit for demonstration purposes, please contact Optilab prior to doing so.

3. The user should avoid using any solvent or vaporizing chemical to clean the equipment panel or case. It may result in damage to the surface and internal circuits.

2. Operation

2.1. Introduction

This chapter describes how to operate the TWL-P-HS, and discusses the location and function of the controls and connectors.

2.2. Initial Inspection

Your TWL-P-HS was carefully inspected before it left the manufacturer. It should be in proper working order upon receipt. You should, however, inspect the unit for any damage that may have occurred in transit. If the shipping container or the packing material is damaged, keep it until the contents of the shipment have been checked to be free of mechanical and electrical damages. Notify Optilab, LLC promptly if any notable damage is found.

The TWL-P-HS shipment should include the following:

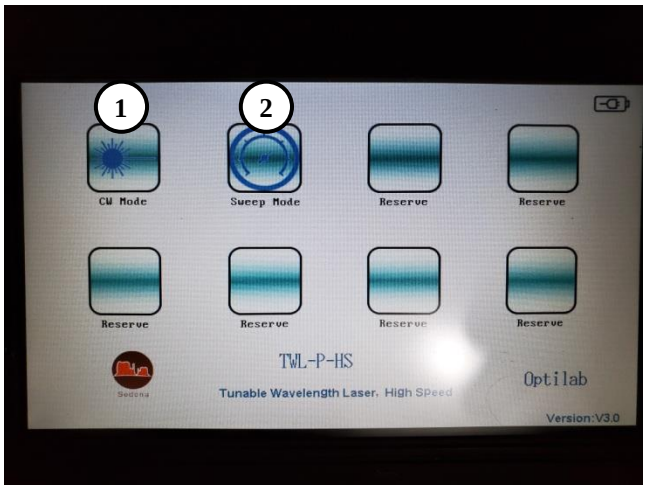
- TWL-P-HS device
- Power Supply

2.3. Controls

Top Panel & Side Panel

FEATURE	FUNCTION
① POWER SWITCH	This switch toggles the main DC power to the TWL-P-HS unit.
② **OPTICAL OUTPUT PORT**	This port provides the optical output from the high speed tunable wavelength laser.
③ **TRIGGER IN PORT**	Reserved.
④ **TRIGGER OUT PORT**	This port provides the option to monitor the sweeping period when the Sweep Mode is enabled.
⑤ USB PORT	This USB port is used to communicate with the TWL-P-HS unit and is not necessary for normal operation. Please contact Optilab if you wish to know more about this communication port.
⑥ +/- 5 VDC CONNECTION PORT	This +/- 5VDC connection port is used to connect to the +/- 5VDC power supply to power up the TWL-P-HS unit.

Main Page



FEATURE	FUNCTION
① CW MODE	CW Mode control page.
② SWEEP MODE	Sweep Mode control page.

2.4. Operation Instructions

1.1.1 Start-up Procedure

1. Ensure the back surface of the TWL-P-HS has proper ventilation or heat-sinking.

2. Connect the TWL-P-HS Output (2) to your system or test setup via a patchcord or optical fiber before powering on the unit. The Output (2) connector is FC/APC.

3. Depress and hold the power switch on the top left corner of the device until the LCD screen powers on.

4. The Main page should now be displayed. The user can select between two modes of operation: Continuous Wave (CW) mode or Sweep mode.

1.1.2 Continuous Wave (CW) Mode

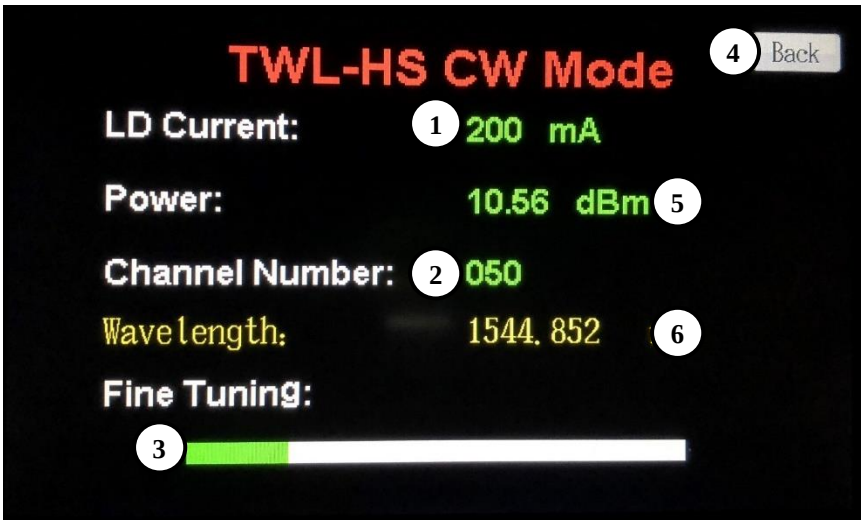
1. To enable continuous wave mode, select the CW mode icon on the Main page.

2. The continuous wave mode page is displayed as shown below.

3. Set the LD current (1) and Channel Number (2) to achieve desired power and ITU grid wavelength.

4. The wavelength can be further adjusted using Fine Tuning (3).

CW Mode Control Page



FEATURE	FUNCTION
① LD CURRENT	Sets the desired LD current from 0 to 250 mA. This will control optical output power.
② CHANNEL NUMBER	Sets the desired ITU channel number from 0 to 99. This will set the output wavelength to the corresponding ITU grid channel. Refer to table 1 at the end of this section.
③ FINE TUNING	Fine tunes the output wavelength.
④ BACK BUTTON	This button will lead you back to the Main page.
⑤ OPTICAL POWER DISPLAY	Output optical power display in dBm.
⑥ WAVELENGTH DISPLAY	Output wavelength display in nm.

1.1.3 Sweep Mode

1. To enable sweep mode, select the sweep mode icon in the Main page.

2. The sweep mode page is displayed as shown below.

3. Set the Start Channel (1) and Stop Channel (2) to set the desired sweep range. The actual start and stop wavelength are displayed along with the channel number.

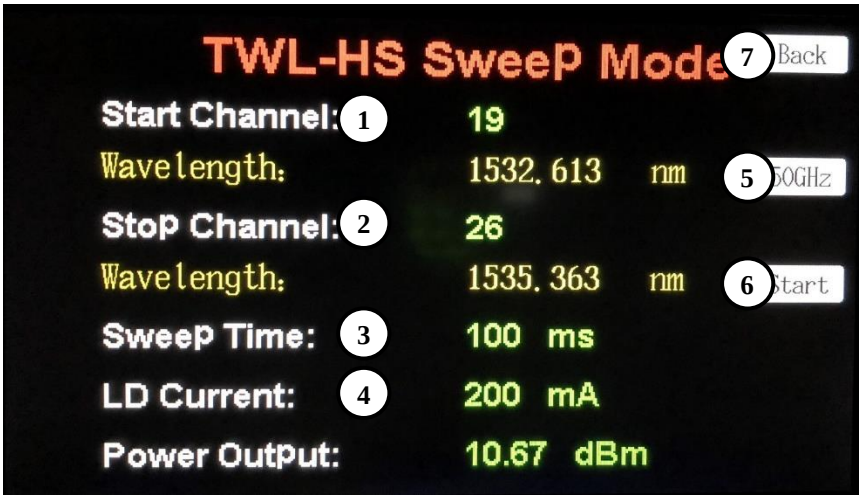
4. Set the Sweep Time (3). This will determine the period of time it takes to sweep from start channel to stop channel.

5. Set the LD Current (4). This will determine the optical output power.

6. Select the desired channel spacing (5). 100 GHz spacing will result in emission of every other channel (e.g. CH19, CH21, CH23, etc). 50 GHz spacing will result in emission of every channel (e.g. CH19, CH20, CH21, etc).

7. Push Start (6) to begin the sweep.

Sweep Mode Control Page



FEATURE	FUNCTION
① START CHANNEL	Sets the desired channel number from 0 to 99 to set the START wavelength for sweeping.
② STOP CHANNEL	Sets the desired channel number among 0 to 99 to set the STOP wavelength for sweeping.
③ SWEEP TIME	Sets the desired sweep time from 10 to 1000 ms. The output wavelength will sweep from the start ① to stop ② channel within the sweep time you set.
④ LD CURRENT	Sets the desired LD current from 0 to 250 mA. This will control optical output power.
⑤ SPACING SWITCH BUTTON	Sets the desired channel spacing, either 50GHz and 100GHz spacing.
⑥ START/STOP BUTTON	Starts/stops the sweep operation.
⑦ BACK BUTTON	This button will lead you back to the Main page.

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1.1.4 Shutdown Procedure

To shut off the TWL-P-HS, simply depress and hold the power switch button until the LCD screen turns off. Shut off the TWL-P-HS before disconnecting the optical output port to prevent exposure to the high power laser light.

1.1.5 Patchcord Swapping Procedure

1. Shut off the TWL-P-HS.

2. Swap patchcords as desired. Make sure to clean them as necessary.

3. Make all desired connections to your system or test setup.

4. Power on the TWL-P-HS

2.5. PC Connection Mode (OPTIONAL)

By using the supplied USB port on the side panels, the user can then monitor and control the TWL-P-HS through a software interface on the PC. For more information, please contact Optilab for details.

3. Table 1 ITU Grid Channel Spacing

CH Num	λ (nm) 50 GHz	CH Num	λ (nm) 50 GHz	CH Num	λ (nm) 50 GHz	CH Num	λ (nm) 50 GHz
0	1527.129	25	1540.863	50	1552.435	75	1562.543
1	1527.132	26	1541.260	51	1552.836	76	1562.951
2	1527.906	27	1541.656	52	1552.238	77	1563.357
3	1528.297	28	1542.054	53	1553.641	78	1563.765
4	1528.687	29	1542.450	54	1553.044	79	1563.772
5	1528.077	30	1542.847	55	1554.446	80	1563.581
6	1529.468	31	1543.245	56	1554.849	81	1564.589
7	1529.859	32	1543.642	57	1555.255	82	1564.997
8	1530.634	33	1544.039	58	1555.657	83	1565.405
9	1531.029	34	1544.829	59	1556.060	84	1565.814
10	1531.809	35	1545.226	60	1556.465	85	1566.225
11	1532.592	36	1545.626	61	1556.867	86	1566.634
12	1533.377	37	1546.024	62	1557.272	87	1567.043
13	1534.555	38	1546.423	63	1557.675	88	1567.453
14	1534.948	39	1546.821	64	1558.081	89	1567.863
15	1535.341	40	1547.220	65	1558.486	90	1568.273
16	1536.517	41	1547.623	66	1558.893	91	1568.684
17	1537.306	42	1548.422	67	1559.293	92	1569.096
18	1537.702	43	1548.825	68	1559.702	93	1569.506
19	1538.096	44	1549.622	69	1560.104	94	1569.918
20	1538.492	45	1550.025	70	1560.511	95	1570.328
21	1538.884	46	1550.426	71	1560.919	96	1570.741
22	1539.281	47	1551.229	72	1561.325	97	1571.154
23	1539.677	48	1551.631	73	1561.730	98	1571.567
24	1540.073	49	1552.033	74	1562.135	99	1572.370

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4. Troubleshooting

SYMPTOM	POSSIBLE CAUSE AND SOLUTION
OPTICAL OUTPUT POWER FROM TRANSMITTER NOT HIGH ENOUGH.	**C:** Optical output connector is dirty. **S:** Disable optical output and clean optical connectors.
	C: Use of incorrect optical adapter or connector. **S:** Use only the indicated optical adapter and connector. If measurement instruments accept different connector type, then use a hybrid patchcord.
	C: Optical output connector damaged. **S:** Measure optical output power with power meter and compare with original test data. Return to Optilab for repair if the difference is high (>4 dB) and cannot be corrected by cleaning or replacing the optical connectors. Always apply dust cover plugs to unused optical receptacles to prevent the damage of internal optical connectors.
UNIT DOES NOT POWER UP.	**C:** Insufficient electrical voltage. **S:** Check that the electrical supply is 110/220 VAC.
	C: Power cord is loose. **S:** Plug power cord is firmly into the unit.
UNIT RESETS OR BLINKS ON AND OFF	**C:** Insufficient electrical voltage. **S:** Check that the electrical supply is at least 110/220 VAC.

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5. Service and Support

5.1. Warranty

Optilab, LLC guarantees its TWL-P-HS to be free of defects for 1 year from the date of shipment. The guarantee does not cover any damages resulting from the misuse or improper handling of the equipment, or any incidental or consequential loss. Note that the warranty will be void upon any attempt to open or to fix the equipment by the user without prior approval of Optilab, LLC.

5.2. Service and Calibration

Your TWL-P-HS has been designed to provide years of trouble-free operation. No internal maintenance is required provided that the equipment is properly handled, operated and kept away from contamination. For any questions regarding the operation and performance of the unit, please contact Optilab, LLC at:

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5.3. Care of Fiber-optic Connectors

Damage to optical connectors account for more than 70 percent of equipment performance degradation. To avoid such damage, the user should use only industrial grade 99% pure isopropyl alcohol and follow the procedures below to keep the connectors, adaptors and receptacles clean.

Cleaning Optical Connector End-face with Wipe and Alcohol

To properly clean optical connectors utilizing lens tissue grade wipes and alcohol follow the procedure below. The moist wipe removes dust particles, oil and contaminants that may damage or blot the end-face of the connector during connection. The dry wipe removes residual alcohol that may be ignited by optical emission.

1. Disable the optical output and turn off unit to prevent accidental exposure or damage to the optical connector by optical emission.
2. Moisten a wipe with alcohol by placing on top of the alcohol dispenser and push down to saturate the wipe.
3. Place the moist wipe on a work surface, and place a second dry wipe next to it.
4. Wipe the optical connector, end-face down on the moist wipe 3 times and then repeat on the dry wipe.
5. Visually inspect the end-face of the optical connector with an optical microscope to verify cleanliness. Repeat steps 2 to 5 as needed.

Cleaning Optical Connector Sides, Receptacles, Adaptors with Swab and Alcohol

Dust or particles can adhere to the insides of receptacles and adaptors or the sides of the optical connector ferrule. Their presence can affect the alignment of the optical fiber connectors and increase connection loss. To properly clean optical connectors, receptacles, and adaptors utilizing a swab and alcohol follow the procedure below:

1. Disable the optical output and turn off unit to prevent accidental exposure or damage to the optical connector by optical emission.
2. Moisten the swab by placing it on top of the alcohol dispenser and push down to saturate the swab.
3. For receptacles, adapters, or other connection points, insert the moistened swab and rotate the tip 1/2 turn clockwise and counter-clockwise 6 times while applying light but firm pressure.
4. For fiber connectors, rotate the tip of the moistened swab 5 revolutions around the connector while applying light but firm pressure.
5. Visually inspect the end face of the connector with an optical microscope to verify cleanliness. Clean end-face as needed.