Operations Guide

for

Desktop Optical Fiber Amplifier

2-1-15 Ohara, Fujimino, Saitama 356-8502, Japan
Phone: +81-49-278-7829, Facsimile: +81-49-263-9328
e-mail: info@fiberlabs.co.jp
web: http://www.fiberlabs.co.jp

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1. Safety precautions

All technical information and recommendations related to FiberLabs products prescribed in this manual are believed to be reliable. Before utilizing the product, the user should determine the suitability of the product for its intended use. The user shall assume full responsibility for all risks and liability whatsoever in connection with such use.

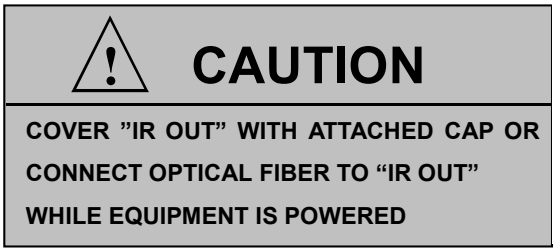
1.1. The symbols used in this manual

⚠ WARNING	If a Person operates in a wrong way by ignoring this symbol, death or serious injury may occur.

⚠ CAUTION	If a person operates in a wrong way by ignoring this symbol, there is a possibility of causing hazard to the person, or damage to the instrument.

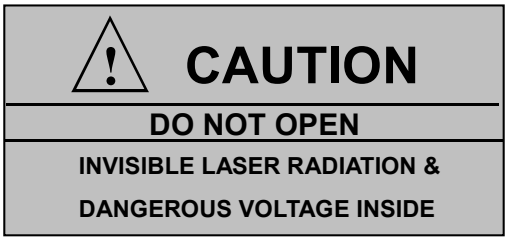
1.2. The labels attached on this instrument

Label 1



Cover "OUTPUT" with attached CAP or connect an optical fiber to "OUTPUT" before turning on the main switch.

Label 2



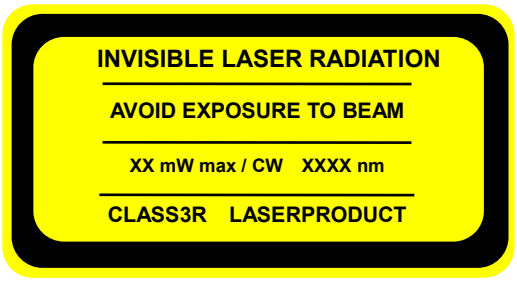
Class 3B laser inside, direct light may harm your eyes and skin. Touching the dangerous voltage give you an electrical shock.. Don't open enclosure.

Label 3

Laser label:

Please note that laser radiation.

Label 4 (example)



Laser class description:

Our products are compliant to IEC 60825-1-2001. Descriptions of the label depend on the laser class. Laser class, emission wavelength, the maximum output power of this product is described to the attached specifications.

2. Preparations before use

2.1 For your own safety

- This instrument emits invisible IR light. Never peep into the output port without regard to the power supply being on or off. This could cause serious disorders to human bodies. Make sure that no light is emitted from the optical connector end face before observation by using a microscope and otherwise.
- Thoroughly read this operation manual before using this amplifier. Controlling or adjusting this amplifier in procedures not specified in this manual may cause dangerous exposure of laser radiation.
- Do not insert or drop a foreign object such as a metallic piece into the inside of the instrument through the openings, otherwise this may cause a instrument malfunction, a fire, or an electric shock.
- Do not disassemble or alter the instrument. If the housing of the instrument is opened while the instrument is being powered, operators may be exposed to dangerous laser radiation. This may cause a instrument malfunction, a fire, or an electric shock.

⚠ CAUTION	Only desktop-mount use. Use in the state that you can disconnect the main cable quickly whenever it is necessary, in case of fire or emergency.

⚠ CAUTION	Do not locate the instrument in the area where the fan on the back of the instrument or the air holes are blocked, otherwise it may cause a fire as well as an instrument malfunction.

2.2 For stable use

- Avoid using the instrument in a dusty location.
- For connection with the instrument, use optical fibers without any scratches or dust on the end face. Before connecting the optical fibers, clean the end face of the connecting optical fiber with alcohol. We also recommend that operators directly check that there are no scratches or dust adhering on the end face by using a microscope.

・ When this instrument is not in use, protect the optical connector from dust and dirt by putting the connector protection cap on. When the instrument is not used for a long period of time, we recommend the removal of the power plug from the receptacle for safety reasons.

・ The standard characteristics of this instrument are as given by the attached “Final Test Inspection Record”. The record represents the initial values under the standard operating current of the pump-LD at room temperature, which means that the initial values may vary according to the operating circumstances.

・ During the instrument operation, do NOT attach or detach the optical fiber cables. Otherwise it may cause severe damage to the instrument itself and/or the optical devices outside.

・ For stable use of this instrument for a long time, it is recommended that you use it under a driving condition below the standard driving current. Please note that driving the pumping-use semiconductor laser with a current larger than the standard driving one may accelerate deterioration of this instrument.

・ Please note that the warranty will expire in case of failures and malfunctions resulting from controls or adjustments made by operation procedures not specified by this manual.

3. Power source

Only use the three-pronged AC power cable that is provided with this instrument. When connected to an appropriate receptacle, this cable earths the instrument cabinet.

This instrument has an auto-ranging line voltage input to accommodate different voltage standards, please ensure that your power source falls within the range specified on the rear panel.

⚠ WARNING	Failure to provide earth ground can cause severe damage to person. Only use a three-pronged AC power cord that is provided with the equipment

4. Description of respective units

Figure 1 & 2 below show the front and the rear panel configurations of the instrument. Names and functions of each part are summarized in the following Table 1.

*The size and layout may vary depending on the model.

*Some of products over laser class 4

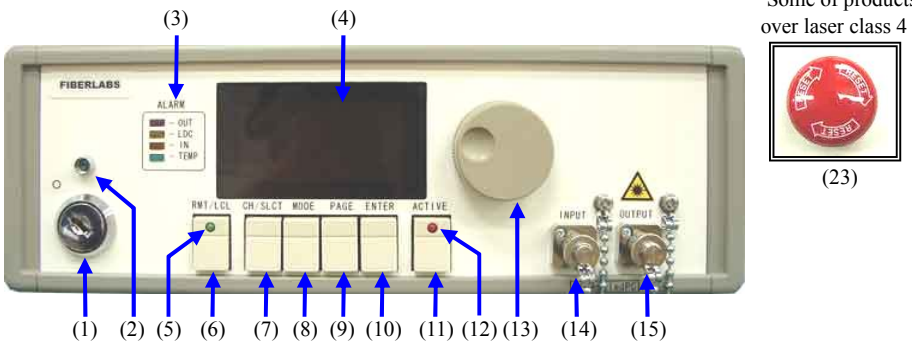


Fig.1 Front panel

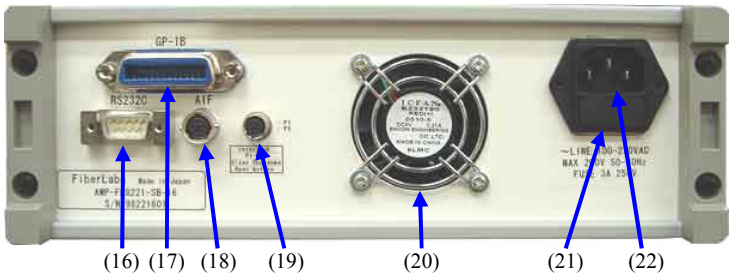


Fig.2 Rear panel

Table 1 Names and functions of the parts

No.	Name		Functions
(1)	Key Switch		Switches ON/OFF the power supply
(2)	Power Indicator LED (green)		Lights while the power switch is ON
(3)	Alarm LEDs	OUT (red)	Lights when the output level falls down to the setting value or below
		LDC (yellow)	Lights when the pump-LD current exceeds the setting value
		IN (orange)	Lights when the input level falls down to the setting value or below
		TEMP (green)	Lights when temperature inside the case rises above the setting value
(4)	Display		Indicates information of this instrument
(5)	REMOTE LED (green)		Lights when a remote operation is selected
(6)	REMOTE / LOCAL		Selects a local or a remote operation It can also be used as the hold function to prevent accidental operation.
(7)	CH / SELECT		Shift Pump-LD channel / Select a item
(8)	MODE		Select a display mode
(9)	PAGE		Select a page
(10)	ENTER		Saves the values or the status
(11)	ACTIVE		Switches ON/OFF the Pump-LDs
(12)	ACTIVE LED		Lights when the Pump-LDs are ON, and blink when output is restricted.
(13)	Adjust Dial		Adjusts each setting value at your discretion
(14)	Input Port		Optical input connector
(15)	Output Port		Optical output connector
(16)	RS232C		RS232C interface
(17)	GP-IB		GP-IB interface
(18)	Maintenance Port		For the manufacturer's use only
(19)	Interlock Port		In an emergency, stops the amplifier with an external signal
(20)	Fan		For ventilation
(21)	Fuse Box		A fuse and a spare are stored
(22)	AC Power Inlet		Plug the power code in with the appropriate power source.
(23)	Emergency stop button		Power off in an emergency. (Some of products over laser class 4)

5 Operating guide

The following are basic operations for this instrument. Before the actual operation, we recommend that you carefully read ‘6. How to Change setting / Description of each Display’

5.1 Startup Procedures

(1) Before connecting the power code, check that the Key Switch is OFF (○).

(2) Connect an optical fiber cable to the input port and another one to the output port. Check the attached “Final Test Inspection Record”, and use the patch cables that meet the connector / fiber type of this instrument.

(3) Make sure that the opposite side of the connected optical fiber is not open.

(4) Insert the attached power code into an appropriate power source after connecting with the AC inlet

(5) Turn the Key switch on (|), and the Power indicator LED will light. Startup screen will appear.

(6) Make sure that the transition to "MONITOR & ADJUST P1" from the startup screen.

5.2 Adjust optical output level

An adjustment the output level of the optical fiber amplifier is done by changing pump-LDs drive settings.

(1) Provide an input signal. If the instrument has input level monitor function, you can monitor at “MONITOR & ADJUST” display mode.

(2) Check pump-LD driving mode settings. For details of ‘ACC’ / ’ALC’, please refer to ‘7.Pump-LD driving mode’. How to change driving mode settings, please refer to ‘4.3.SETTING’.

(3) Turn the Adjust dial gradually to adjust the driving current of the pump-LD (on ACC) or the optical output level (on ALC) to the desired value. ‘ENTER' button to confirm the setting.

(4) If the models are equipped with multiple pump-LDs, you need set the same for all LDs. ‘CH/SLCT' button to select the channel of LD. The number of LDs and standard settings of each LDs are described in the attached “Final Test Inspection Record”.

Please refer to ‘7.3 How to ALC setting for instrument with multiple pump-LD’ when you operate on the ALC mode.

5.3 Activate output

Press the 'ACTIVE' button to start the optical output. the ACTIVE LED lights when the pump-LDs are being driven. Wait a minute until the pump-LD temperature becomes stable, confirm that almost equal to the setting value by the monitor.

⚠ WARNING	When the 'ACTIVE' button is pressed with the input/return loss interlock is set to OFF, the ASE light may be emitted from the output port regardless of an input signal provided or not. Exercise due care for your own safety.

⚠ WARNING	Depending on the model, some light may be emitted from the output port regardless of the setting of LDs when the ACTIVE button is pressed. Exercise due care for your own safety.

⚠ CAUTION	Make certain that the input signal with the proper optical power is being provided before press the 'ACTIVE' button. Otherwise unexpected optical surge might damage severely to the devices both inside the unit and outside.

⚠ CAUTION	Please note that when you select "ALC" mode, the "ALC" mode might not work normally in the case that the pump-LD driving current is near the limit value, which is shown in the attached "Final Test Inspection Record".

5.4 Stopping Procedures

(1) Press the 'ACTIVE' button to stop the optical output. Make sure that the ACTIVE LED is turned off., and stop the driving of pump-LDs from monitor value.

(2) Turn the Key switch off (○), and the power indicator LED will turned off.

⚠ CAUTION	Make sure the ACTIVE LED is turned off before switching OFF the main Key. Otherwise, the instrument trouble might occur.

6. How to Change setting / Description of each Display

6.1 The display page transition.

The user interface of this instrument is categorized into 3 display mode (‘MONITOR & ADJUST’ / ‘SETTING’ / ‘SYSTEM’) and each mode has some pages. Figure 3 shows the display mode / page transition. When starting up the instrument, the Monitor & Adjust Page 1 appears on the display.

*Pages of ‘MONITOR & ADJUST’ may vary depending on the number of LDs / signal monitors.

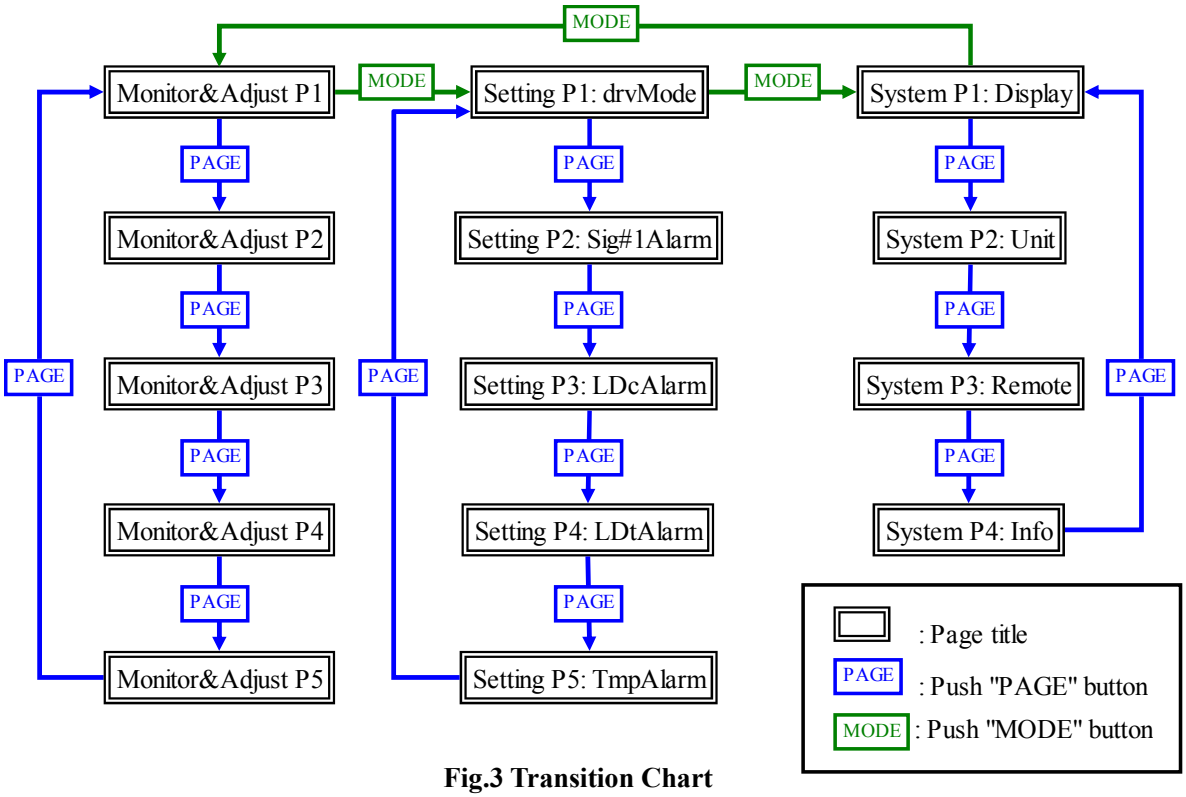


Fig.3 Transition Chart

6.2 MONITOR & ADJUST （adjust output levels / monitor system）

MONITOR & ADJUST is where you adjust the output level and monitor parameters.

- Select the Pump-LD channel by ‘CH/SLCT’ button
- Adjust the pump-LD current (on ACC) or the optical output level (on ALC) by ‘Adjust Dial’
- Save the value(s) by ‘ENTER’ button. If not, the values return to the previous ones.

Table 2 Items of Monitor & Adjustment

Page	Function
1	Adjust : Pump-LD current (ACC mode) / Output level (ALC mode) Monitor : Pump-LD current (ch1/ch2)
2	Adjust : Pump-LD current (ACC mode) / Output level (ALC mode) Monitor : Output level #1 / Input level #1
3	Monitor : Pump-LD temperature
4	Monitor : Return loss at output port
5	Monitor : Case Temperature

*The number of pages varies depending on the number of LD / input / output monitor. Therefore, the page number may differ from your instrument.

6.2.1 Page 1 details (Fig.4)

(1) Pump-LD channel selected

(2) Driving mode of pump-LD

(3) Setting value

ACC mode : Pump-LD current (mA / A)

ALC mode : Optical output level (dBm / mW)

(4) Monitoring the pump-LD current

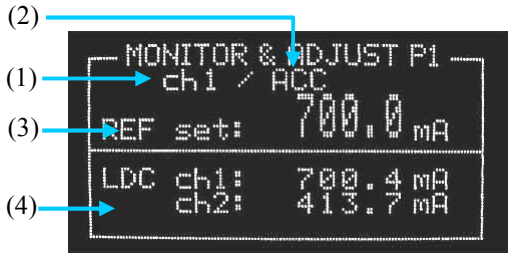


Fig.4 MONITOR & ADJUST P1 (e.g.)

6.2.2 Page 2 details (Fig.5)

(1) Monitoring of the output level (dBm / mW) / the input level (dBm / uW)

Fig.5 MONITOR & ADJUST P2 (e.g.)

6.2.3 Page 3 details (Fig.6)

(1) Pump-LD temperature (degC / degF)

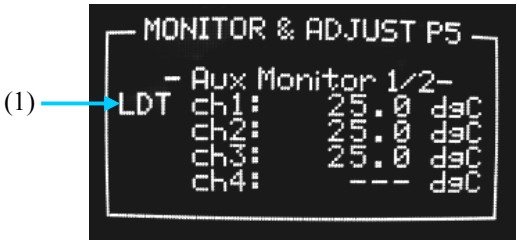


Fig.6 MONITOR & ADJUST P3 (e.g.)

6.2.4 Page 4 details (Fig.7)

(1) Return loss at output port (dB / %)

* Output levels and return levels must be above certain levels for displaying value.

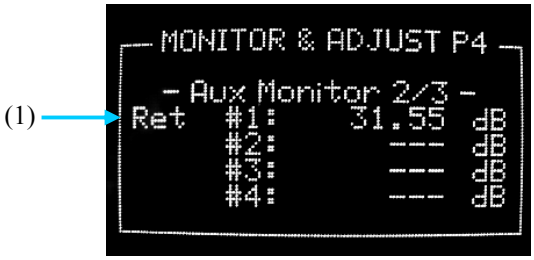


Fig.7 MONITOR & ADJUST P4 (e.g.)

6.2.5 Page 5 details (Fig 8)

(1) Case temperature (deg.C / deg.F)

Fig.8 MONITOR & ADJUST P5 (e.g.)

6.3 SETTING（change Pump-LD driving modes / alarm settings）

SETTING is where you change the driving modes and set alarm parameters.

- Select item by 'CH/SLCT' button.
- Select lists / adjust values by 'Adjust Dial'.
- Save the value(s) by 'ENTER' button. If not, the values return to the previous ones.

Table 3 Items of Setting

Page	Function
1	Pump-LD driving mode
2	Signal Alarm : Threshold & ON/OFF
3	Pump-LD Current Alarm : Threshold & ON/OFF
4	Pump-LD Temperature Alarm : Threshold & ON/OFF
5	Case Temperature : Threshold & ON/OFF

*The number of pages varies depending on the number of LD / input / output monitor. Therefore, the page number may differ from your instrument.

6.3.1 Page1: drv Mode details (Fig.9)

This page is where you change the pump-LD driving modes.

(1) Pump-LD channel number

(2) Driving mode at each channel

Select a driving mode from "ALC" / "ACC". Channel is not installed shows "---".

"ACC ONLY" display channel is fixed on ACC mode. It can not be changed.

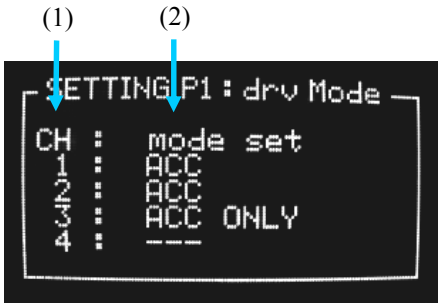


Fig.9 SETTING P1 (e.g.)

6.3.2 Page2: SigAlarm details (Fig.10)

This page is where you set the signal alarm settings.

(1) Output level alarm threshold

The alarm is issued when the output level reaches down to the threshold value or below.

(2) Input level alarm threshold

The alarm is issued when the input level reaches down to the threshold value or below.

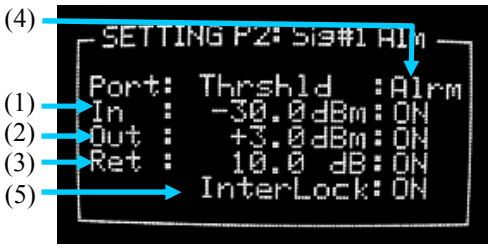


Fig.10 SETTING P2 (e.g.)

(3) Returnloss alarm threshold

The alarm is issued when the return loss at the output port reaches down to the threshold value or below.

(4) Alarm detection valid / invalid

If you set this item to OFF, the alarm does not trigger even if the problem occurred.

(5) Input / Return loss interlock

If you set this item to ON, pump-LDs are interlocked with input/return loss alarm.

Please refer to 8.2 Input/Return interlock for more information.

Please note that the interlock function won't be activated unless the input/return loss alarm detection is set to ON.

6.3.3 Page3: LDcAlarm details (Fig.11)

This page is where you set the pump-LD current alarm settings.

(1) Pump-LD channel number

(2) LD current Alarm Threshold

The alarm is issued when the pump-LD current reaches up to the threshold value or above.

(3) Alarm detect valid / invalid

If you set this item to OFF, the alarm does not trigger even if the problem occurred.

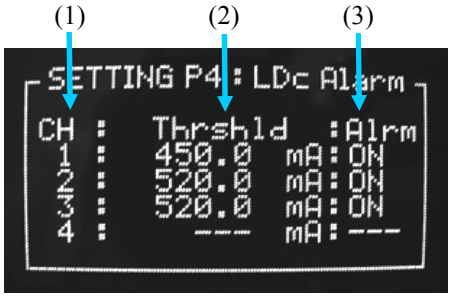


Fig.11 SETTING P3 (e.g.)

6.3.4 Page4: LDtAlarm details (Fig.12)

This page is where you set the pump-LD temperature alarm settings.

(1) Pump-LD channel number

(2) LD temperature Alarm Threshold

The alarm is issued when the pump-LD current reaches up to the threshold value or above.

(3) Alarm detect valid / invalid

If you set this item to OFF, the alarm does not trigger even if the problem occurred.

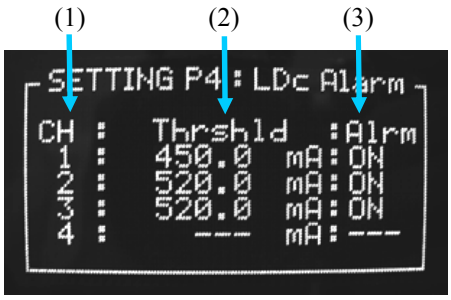


Fig.12 SETTING P4 (e.g.)

6.3.5 Page5: MiscAlarm (Fig.13)

This page is where you set the miscellaneous alarm settings.

(1) Case temperature Alarm Threshold

The alarm is issued when the case temperature reaches up to the threshold value or above.

(2) Alarm Status

If you set this item to OFF, the alarm does not trigger even if the problem occurred.

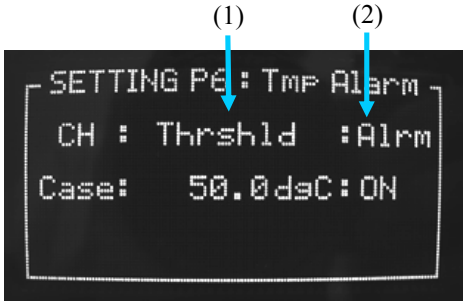


Fig.13 SETTING P5 (e.g.)

6.4 SYSTEM（change display / remote setting）

SYSTEM is where you set the display and the remote I/F settings and display system information.

- Select item by 'CH/SLCT' button
- Select list / adjust value by 'Adjust Dial'
- Save the value(s) by 'ENTER' button. If not, the values return to the previous ones.

Table 4 Items of System mode

Page	Function
1	Display Settings
2	Unit Settings
3	Remote Control Interface Settings
4	System Information

6.4.1 Page1: Display (Fig.14)

This page is where you set the display settings.

(1) Monitor Renewal Interval

Select one from 0.2 / 0.5 / 1.0 / 2.0 sec.

(2) Display Brightness

Adjust a brightness of display.

We recommend setting brightness to lower level, if you leave the instrument for a long time.

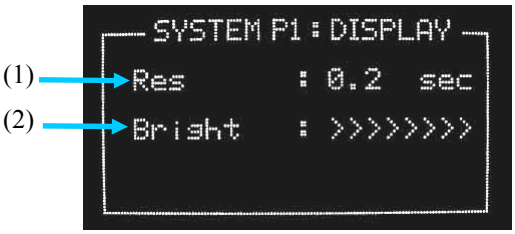


Fig.14 SYSTEM P1 (e.g.)

6.4.2 Page2: Unit details (Fig.15)

This page is where you set the unit of values settings

(1) Optical Power Unit

Choose one from “Lin” (mW / uW / %) or “Log” (dBm / dB).

(2) Current Unit

Choose one from “mA” or “A”.

(3) Temperature Unit

Choose one form Celsius (deg.C) or Fahrenheit (deg.F).

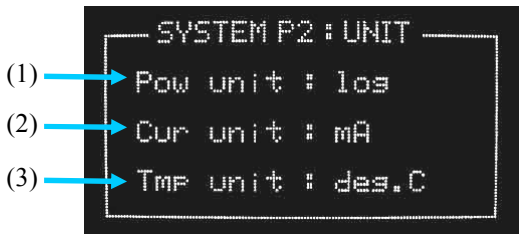


Fig.15 SYSTEM P2 (e.g.)

6.4.3 Page3: Remote (Fig.16)

This page is where you set the remote I/F settings

(1) Choose delimiter (terminator) from “CR” or “LF”.

It’s common for both RS232C and GP-IB

(2) RS232C baud rate

Choose from 9600bps to 56400bps.

(3) GP-IB address

Select from 0 to 30.

(4) GP-IB SRQ (service request)

Set GP-IB SRQ function to “ON” or “OFF”.

Please refer to Programming manual for more information about SRQ function.

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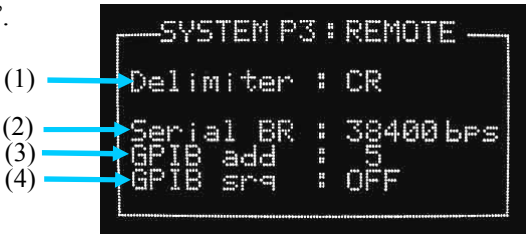

Fig.16 SYSTEM P3 (e.g.)

6.4.4 Page 4 details (See Figure 17)

System information for maintenance at manufacturer's site

(1) The number of Pump-LD installed.

(2) The number of Optical path.

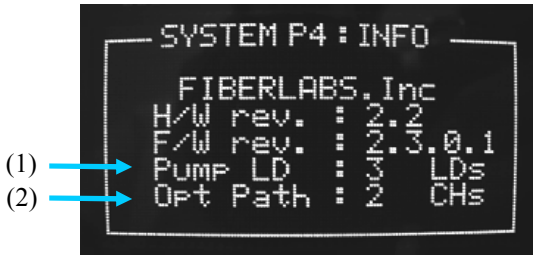

Fig.17 SYSTEM P4 (e.g.)

6.5 Remote and Local state

A remote state or a local state can be selected by 'CH/SLCT' button. On the detection of the remote operation request from outside, the instrument is changed automatically to the remote state. During the remote operation, the 'REMOTE LED' is lighted and any local operations except 'ACTIVE' and 'RMT/LCL' buttons are invalid. To return to the local operation, press 'RMT/LCL' button. These features are available as a hold function to prevent inadvertent operation.

7. LD driving mode

This instrument can be select the pump-LD driving mode from ACC (Auto Current Control : constant pump-LD current mode) / ALC (Auto Current Control : constant pump-LD current mode).

7.1 ACC (Auto Current Control : constant pump-LD current mode)

A control mode that maintains a pump-LD current at constant value. You can easily adjust the output level. It is useful if you need to adjust the output level for optimizing channel settings. On the other hand, output level levels may fluctuate due to the variation of the optical input level, the input wavelength, or the operating temperature.

7.2 ALC (Auto Light Control : constant output level mode)

A control mode that keeps up a constant optical output level. This mode assures you of the constant optical output level in unexpected circumstances under the variation of the optical input level, the input wavelength, or the operating temperature. It is suitable for system operation.

7.3 How to ALC setting for instrument with multiple pump-LD

Some models is mounted multiple pump-LDs. These models have a type all LDs work in conjuction on ALC, and a type the settings of driving mode are only possible in 1LD, the rest of LDs are fixed (ACC only). The following are procedure to setting on ALC.

・A type all LDs work in conjuction

(1) Set drive mode of any LD to ALC on “SETTING : drv Mode” display. At this time, settings of the rest of LDs are automatically changed.

(2) Set the output level on ”MONITOR&ADJUST” display, and press ’ACTIVE’ button.
The current of all LDs will rises sequentially from ch.1 until an output level reaches a preset value.

・A type the settings of driving mode are only possible in 1LD

For easy understanding, the LD that can drive on ALC is named “main-LD”, and the LD that fixed to ACC is named ”sub-LDs” in this chapter.

(1) Set drive mode of main-LD to ALC on“SETTING : drv Mode”display.

(2) Set the output level on ”MONITOR&ADJUST” display, and press ’ACTIVE’ button.
At this time, if it is not enough for the set output level only by the pump power of main-LD, the main-LD current will rises to the limiting value.

(3) Raising the output level by setting the sub-LD current. The main-LD current will decline for feedback from the output monitor when the output level reaches the setting of main-LD.

(4) Set the sub-LD current so that the main-LD current may have enough margin from the limiting value. The standard is about 90% or less of the limiting value.

Now ALC setting is completed. Make sure that the pump-LD current responds to fluctuation of the input signal such as the input cable to bend a little while monitoring the current. The range where the output level can be maintained is the pump-LD current reaches the limiting value from 0. If the fluctuation of the input signal exceeds this range, it will appear to the output level.

Please refer to the attached “Final Test Inspection Record” for the number of pump-LD and the limiting value of the each pump-LD current.

8. Alarm / interlock function

8.1 Alarm function

Each alarm is non-holding. Alarm LEDs are turned off automatically when the values return to their normal level or range.

(1) OUT: Output level alarm

The alarm is issued when the output level reaches down to the threshold value or below, and the OUT LED on the front panel is turned ON.

(2) LDC: Pump-LD current alarm

The alarm is issued when any of pump-LD current reach up to the threshold value or above, and the LDC LED on the front panel is turned ON.

(3) IN/RET: Input level / Return loss alarm

The alarm is issued when the Input level / Return loss reaches down to the threshold value or below, and the IN/RET LED on the front panel is turned ON.

(4) TEMP: Case / Pump-LD temperature alarm

The alarm is issued when the case / any of pump-LD temperature reach up to the threshold value or above, and the TEMP LED on the front panel is turned ON.

8.2 Input level / Return loss interlock

The input level / return loss interlock is a function shuts the output of pump-LD down automatically with the optical input level / return loss alarm to protect this instrument and connected equipment from the trouble because of rapid change of the input signal level and break of the patch cable.

(1) How to enable the interlock function

Refer to '6.3.2 Page2: SigAlarm details', and set interlock and input level / return loss alarm detection to ON. The output will halt and ACTIVE LED will be turned OFF when the input level alarm is issued. And the output will be restricted to laser class 1 or less and ACTIVE LED will blink when the return loss alarm is issued.

While the interlock is triggered, pump-LDs cannot be turned on if you press 'ACTIVE' button.

Pump-LDs doesn't activate automatically even if the status of alarm returns to normal. You have to press 'ACTIVE' button each time. If you want recover the output automatically, refer to '8.4 Auto recovery operation', and set the auto recovery to ON

(2) If you do not use the interlock function

Set the interlock to OFF. The state of output is maintained even if the input level / return loss alarm is issued.

8.3 Emergency remote interlock

The instrument can be stopped with external signals through the Interlock port on the rear panel. When open the circuit between terminals, the optical output will turn off. To restart, short the circuit between terminals and push the ACTIVE button again.

8.4 Auto recovery operation

This instrument can be switched the behavior of the optical output on recovering from interlock state by remote command. Please refer to programming manual for more information about remote command.

(1) On manual recovery operation

Pump-LDs doesn't activate automatically even if the status of alarm returns to normal. You must press ‘ACTIVE’ button or activate by remote command each time.

(2) On auto recovery operation

The instrument starts in a state halting the optical output when the power is turned on. The auto recovery operation starts by pressing the 'ACTIVE' button (or remote activate command). The optical output recovers automatically when the statuses of alarms return to normal.

In addition, it is not posible to set the optical output to OFF by the 'ACTIVE' button while auto recovery operating, you need to turn OFF the power switch if you want to stop the optical output.

CAUTION

The auto recovery from the interlock might be dangerous depending on the laser class of the instrument. If you want to use this function, please use it on sufficient safe operating rules.

8.5 Emergency stop button（Some of products over laser class 4）

Some of products over laser class 4 have the emergency stop button on its front panel to halt the system in an emergency. When the button is pressed, the power supply is stopped. To release the function, turn the button clockwise until it return to the normal position.

9. Connector Cleaning Procedure

This instrument is supplied with a PC or Angled-PC output connector. After check the attached “Final Test Inspection Record”, please use the patch cables that meet the connector / fiber type of this instrument. Do not use an index matching gel. In many cases, not only does not improve the coupling of our standard PC connectors, it causes to a degradation of the performance for contamination of connectors.

Inspect all connector ferrules and make sure that they are clean. Any dirt or imperfections on the ferrule must be removed before connecting to the instrument. Making consistent output with this instrument depends strongly on the quality of optical connections.

The following are procedures for connecting a patch cable to the optical port.

(1) Using filtered dry compressed air blow the end of the connector to remove any loose contaminants.

(2) Apply isopropyl alcohol to a lint free wipe and clean the side of the connector ferrule and the connector body.

(3) Blow connector ferrule once again with the filtered dry compressed air.

(4) Inspect all connector ferrules and make sure that they are clean. Repeat procedures again if there are still any contaminations. If you cannot remove contaminations, using a new optical fiber patch cable

(5) Connect to optical ports of the instrument.

10. Maintenance & Service / Fuse replacement

Only fuse replacement is allowed for users other than normal operation.

Follow these instructions and guidelines for replacing fuse. A spare fuse is located inside the fuse box. (Fig.19). Prepare a brand-new Fuse; 3A / 250V (φ5 x L =20mm) just in case.

⚠ WARNING	Do not open the inside of the unit. Dangerous voltage and Class 3B laser inside.

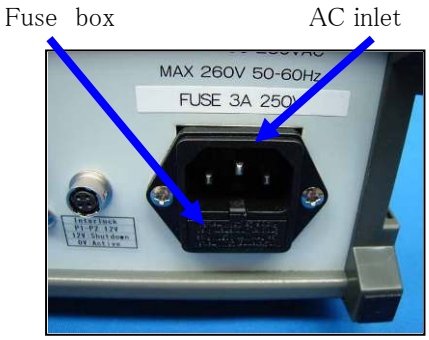

Fig. 19 Fuse box, AC inlet（Rear panel）

(1) Turn the key switch on the front panel to the OFF position.

(2) Insert a minus screwdriver at an angle into the hole at the top of the fuse box on the rear panel. (Fig.20)

(3) Pull out the fuse box after it was pushed out from the unit case. (Fig.21)

(4) Remove the blown fuse from the fuse box and discard. (Fig.22)

(5) Place the replacement fuse into the fuse box.

(7) Reset the fuse box until it clicks into the proper position.

(8) For restart of the unit, follow the operating procedures described in the manual.

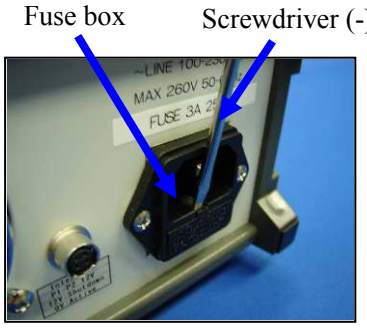

Fig. 20

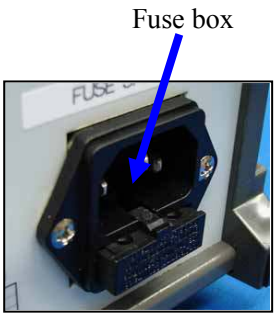

Fig. 21

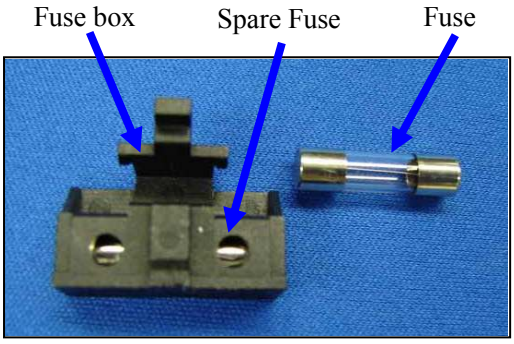

Fig. 22

⚠ CAUTION

Use the specified type of fuse.

Fuse Type: 250 V 3 A

11. Troubleshooting

11.1 Things to do before troubleshooting

This chapter describes the items to be checked before troubleshooting when the instrument does not operate as intended.

(1) The power indicator LED does not light.

・ Check the AC power cable and the range of AC voltage.

・ Check the fuse whether it is not blown out.

・ Check the emergency stop button if the instrument has it.

(2) The level of the optical output level is lower than that in the specifications, or unstable.

・ Check the interlock function is not working.

・ In the case of the instrument that has multiple pump-LDs, You need to set for all LDs. Check the attached “Final Test Inspection Record” and refer to ’6.2 MONITOR & ADJUST’, and set for all pump-LDs properly.

・ Check the installation of the optical fiber patch cables.

・ Check that the type of connecting patch cables is compatible with the connector of this instrument.

・ Check all connector ferrules of connecting patch cables and make sure that they are clean. If contaminations are observed, ferrules of optical ports of the instrument may be contaminated. If the problem is not resolved by replacing the appropriate patch cables, please contact us.

・ Check the connecting patch cables if there are any increasing insertion loss caused by the breakage of the optical fiber itself.

・ Check the power level, wavelength, stability of the input signal.

11.2 Alarm in steady operation

You can guess the cause of trouble from the alarm type and combination.

The following are the causes guessed from each alarms.

(1) LDC : Excess of the pump-LD current

On ACC, it is shown that a setting value simply exceeds the threshold of LD current alarm.

On ALC, check the power level, wavelength, stability of the input signal and condition of the optical fiber patch cables.

If there is no problem in them, the amplification efficiency might drop because of degradation of the internal optical components. The amplification is not affected at now, but there is a possibility that the decrease progresses if you leaving it.

(2) OUT : Decline of the output level

Check the power level, wavelength, stability of the input signal and condition of the optical fiber patch cables.

If there is no problem in them, the instrument might be unable to keep the output level because the above (1) state progresses further. It is necessary to investigate and repair by the manufacturer, please contact us.

(3) IN/RET : Decline of the input level / Excess of the return loss

Check the power level, wavelength, stability of the input signal and condition of the optical fiber patch cables.

(4) TEMP : Excess of the case / pump-LD temperature

Check the fan on the rear panel is operating properly and the air holes are not blocked,

12. Warranty

This instrument is thoroughly inspected and tested mechanically and electrically throughout the manufacturing and before the shipment from the factory, and warranted to operate properly. Should any failure arise from defect in the manufacturing or any failure arise from accidents in transit, immediately contact us informing the details of the failure. In case we cannot deal with the trouble if the instrument is shipped back to us without a prior notice, contact us in advance in such cases as above.

The instrument is guaranteed for a period of one year from the date of delivery. Those defects that occur within a period of one year after the delivery shall be repaired at no charge. However, free of charge repairing service does not apply in the case of the defect resulting from improper operation use, or to the failure or damage caused by natural disasters even if within the above warranty period. Also, please carefully note that in case the instrument is altered or modified by customers including opening of the housing, the whole warranty shall be invalidated.

FiberLabs Inc.

2-1-15 Ohara, Fujimino-shi, Saitama 356-8502, Japan

Tel: +81-49-278-7829, Fax: +81-49-263-9328

e-mail: info@fiberlabs.co.jp, URL:http://www.fiberlabs-inc.com

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