

# **PureFlow WS1**

## **Traffic Shaper NF7500 series Operation Manual**

**Fifth Edition**

**For safety and warning information, please read this manual before attempting to install and use the equipment.**

**Keep this manual with the equipment.**

**ANRITSU CORPORATION**

# Safety Symbols

To prevent the risk of personal injury or loss related to equipment malfunction, Anritsu Corporation uses the following safety symbols to indicate safety-related information. Ensure that you clearly understand the meanings of the symbols BEFORE using the equipment. Some or all of the following symbols may be used on all Anritsu Corporation equipment. In addition, there may be other labels attached to products that are not shown in the diagrams in this manual.

## Symbols used in manual



### **DANGER**

This indicates a very dangerous procedure that could result in serious injury or death if not performed properly.



### **WARNING**

This indicates a hazardous procedure that could result in serious injury or death if not performed properly.



### **CAUTION**

This indicates a hazardous procedure or danger that could result in light-to-severe injury, or loss related to equipment malfunction, if proper precautions are not taken.

## Safety Symbols Used on Equipment and in Manual

The following safety symbols are used inside or on the equipment near operation locations to provide information about safety items and operation precautions. Ensure that you clearly understand the meanings of the symbols and take the necessary precautions BEFORE using the equipment.



This indicates a prohibited operation. The prohibited operation is indicated symbolically in or near the barred circle.



This indicates an obligatory safety precaution. The obligatory operation is indicated symbolically in or near the circle.



This indicates a warning or caution. The contents are indicated symbolically in or near the triangle.



This indicates a note. The contents are described in the box.

PureFlow WS1  
Traffic Shaper NF7500 series  
Operation Manual

31 May 2017 (First Edition)  
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Printed in Japan

# For Safety

## **WARNING**



1 ALWAYS refer to the operation manual when working near locations at which the alert mark shown on the left is attached. If the advice in the operation manual is not followed there is a risk of personal injury or reduced equipment performance. The alert mark shown on the left may also be used with other marks and descriptions to indicate other dangers.

2 Laser radiation warning

NEVER look directly into the opening of the optical modules or the optical fiber cable connectors. The optical modules emit laser beams, so there is a risk of injury if laser radiation enters the eye.

3 To avoid electric shock or failure, do not insert objects in the openings or connectors.

4 To avoid electric shock, disconnect a power cord before maintenance.



or



5 For safety, use the specified 3-pin power cord and the outlet with earth terminal. When using a conversion adapter instead of the 3-pin power cord, be sure to earth the terminal of green ground wire attached to the conversion adapter. If power is supplied without earthing the equipment, there is a risk of receiving a severe or fatal electric.

6 To prevent electric shock, be sure to ground the devices connected to this equipment.

7 An unintended high voltage might be applied to the LAN cable due to lightning or an accident in the power circuitry. Be careful when handling the metal parts of this equipment and the LAN cables.

# For Safety



## WARNING

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### Disassembly



- 8 To avoid fire or electric shock, do not disassemble or modify this device. There are high-voltage parts in this equipment presenting a risk of severe injury or fatal electric shock to untrained personnel. In addition, there is a risk of damage to precision components.

### Falling Over

- 9 This equipment should always be installed in the correct manner. If the equipment is installed incorrectly so that it is unstable, the equipment might fall down or drop from the rack, resulting in injury.

### Cleaning

- 10 Keep the power supply and cooling fan free of dust.
- Clean the power plug regularly. If dust accumulates around the power pins, there is a risk of fire.
  - Keep the cooling fan clean so that the ventilation holes are not obstructed. If the ventilation holes are obstructed, the equipment inside becomes hot and might catch fire.
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# For Safety

## CAUTION

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### **Power Supply**

The power of the equipment is turned off by removing the power plug. Be sure to connect the power cable to an accessible outlet near the equipment so that the power cable plug can be removed easily.

### **Repair**

This equipment cannot be repaired by the customer. If the equipment fails, contact your dealer.

### **External Storage Media**

This equipment can use an SD card or USB flash drive as external data storage media.

The contents of the SD card or USB flash drive might be corrupted due to incorrect usage or device failure.

It is recommended to back up the contents as a precaution.

Anritsu Corporation is not liable for the loss of stored memory.

### **Lifetime of Parts**

This device is equipped with the parts that have life determined by the energization hours in a certain operation environment. These parts can be replaced at the customers' expense even within the warranty period. To use this device continuously for a long period, pay attention to the life of these parts. For details, refer to "B.4 Environment" in this document.

### **Use in Corrosive Atmospheres**

Exposure to corrosive gases such as hydrogen sulfide, sulfurous acid, and hydrogen chloride will cause faults and failures.

Note that some organic solvents release corrosive gases.

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# For Safety

## Laser Safety

The laser in this equipment is classified as Class 1 according to the IEC 60825-1 standards, or as Class I according to the 21 CFR 1040.10 standard.

Class 1 indicates the level of danger of the laser radiation. This is specified in IEC 60825-1 as described below.

Class 1: Lasers that are safe under reasonably foreseeable conditions of operation, including the use of optical instruments to view the beams.

Class I indicates the level of danger of the laser radiation. This is specified in 21 CFR 1040.10 as described below.

Class I: Class I levels of laser radiation are not considered to be hazardous.

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 **CAUTION**

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Use of controls or adjustments or performance of procedures other than those specified herein may result in hazardous radiation exposure.

The use of optical instruments with this product will increase eye hazard.

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## **Regulatory Compliance Statements**

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1 About FCC

FCC Class A Notice (For U.S.A.)

This equipment has been tested and found to comply with the limits for a Class A digital device, pursuant to part 15 of the FCC rules. These limits are designed to provide reasonable protection against harmful interference when the equipment is operated in a commercial environment. This equipment generates, uses, and can radiate radio frequency energy and, if not installed and used in accordance with the instruction manual, may cause harmful interference to radio communication. Operation of this equipment in a residential area is likely to cause harmful interference, in which case the user will be required to correct the interference at his own expense.

2 About VCCI

This is a Class A product based on the standard of the VCCI Council. If this equipment is used in a domestic environment, radio interference may occur, in which case, the user may be required to take corrective actions.

3 About JIS C 61000-3-2

This equipment has been tested and found to comply with the current JIS C 61000-3-2 harmonic standard.

4 About UL 62368-1

This equipment has been tested and found to comply with the UL 62368-1 safety standard.

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# Warranty

Anritsu Corporation will repair this equipment free-of-charge if a malfunction occurs within one year after shipment due to a manufacturing fault.

The warranty for software shall be based on the separate "Software End-User License Agreement". However, Anritsu Corporation will deem this warranty void when:

- The fault is outside the scope of the warranty conditions separately described in the operation manual.
- The fault is due to mishandling, misuse, or unauthorized modification or repair of the equipment by the customer.
- The fault is due to severe usage clearly exceeding normal usage.
- The fault is due to improper or insufficient maintenance by the customer.
- The fault is due to natural disaster, including fire, wind, flooding, earthquake, lightning strike, or volcanic ash, etc.
- The fault is due to damage caused by acts of destruction, including civil disturbance, riot, or war, etc.
- The fault is due to explosion, accident, or breakdown of any other machinery, facility, or plant, etc.
- The fault is due to use of non-specified peripheral or applied equipment or parts, or consumables, etc.
- The fault is due to use of a non-specified power supply or in a non-specified installation location.
- The fault is due to use in unusual environments<sup>(Note)</sup>.
- The fault is due to activities or ingress of living organisms, such as insects, spiders, fungus, pollen, or seeds.

In addition, this warranty is valid only for the original equipment purchaser. It is not transferable if the equipment is resold.

Anritsu Corporation shall assume no liability for damage or financial loss of the customer due to the use of or a failure to use this equipment, unless the damage or loss is caused due to Anritsu Corporation's intentional or gross negligence.

Note:

For the purpose of this Warranty, "unusual environments" means use:

- In places of direct sunlight
- In dusty places
- Outdoors
- In liquids, such as water, oil, or organic solvents, and medical fluids, or places where these liquids may adhere
- In salty air or in place chemically active gases (sulfur dioxide, hydrogen sulfide, chlorine, ammonia, nitrogen dioxide, or hydrogen chloride etc.) are present
- In places where high-intensity static electric charges or electromagnetic fields are present

- In places where abnormal power voltages (high or low) or instantaneous power failures occur
- In places where condensation occurs
- In the presence of lubricating oil mists
- In places at an altitude of more than 2,000 m
- In the presence of frequent vibration or mechanical shock such as in cars, ships, or airplanes

## **Anritsu Corporation Contact**

For information on this equipment, contact an Anritsu Corporation Service and Sales office. Contact information can be found on the safety manual.

## **Maintenance Contract**

Anritsu Corporation can provide a range of optional services under a maintenance contract. For details, contact your dealer.

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This license agreement (“the License”) constitutes a legally binding contract between you and Anritsu Corporation (“Anritsu”) concerning the use of Anritsu NF7500 series software NF7500-S001A (“the Software”). Please carefully read and accept the terms of this Software End-User License Agreement (hereafter EULA) before using (includes executing, copying, installing, registering, etc.). By using this Software, you shall be deemed to have agreed to be bound by the terms of this EULA, and Anritsu hereby grants you the right to use this Software with the Anritsu-specified equipment (hereafter Equipment) for the purposes set out in this EULA.

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This software includes open source software. For open source software, see "Appendix C Third-Party Software License" in this document. If there is the difference between our license and open source software license statement, the open source software license statement takes precedence.

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Anritsu grants you the following usage:

1. You may use the Software for a single designated Anritsu PureFlow WS1 Traffic Shaper device.
2. You may use the Software only for the purposes of carrying out operations in your company.

## 2. Restricted usage

1. The Software may not be used concurrently on more than one computer, regardless of whether the computers are owned by you or by a third party.
2. You may not make a copy of the Software for other than backup purposes, nor may you distribute, lend, rent, lease, use as collateral, or otherwise provide the Software to a third party. The license to use the Software cannot be transferred, sold, or otherwise passed to third party. You may under no circumstances transfer the license to use the Software to a worker or member of another company or group.
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4. You may not modify, correct, or otherwise

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## 3. License Cancellation and Termination

1. Anritsu may terminate this EULA immediately if you violate any conditions described herein. This EULA shall also be terminated immediately by Anritsu if there is any good reason that it is deemed difficult to continue this EULA, such as you violation of Anritsu copyrights, patents, etc. or any laws and ordinances, or if it turns out that you belong to an antisocial organization or has a socially inappropriate relationship with members of such organization.
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2. Anritsu does not guarantee to fix any defects, including bugs and structural problems that might exist in the Software. Each written information or advice given by Anritsu shall require a new warranty, or in any way increase the scope of this warranty.

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#### **7. Change of Terms**

Anritsu may change without your approval the terms of this EULA if the changes are for the benefit of general customers, or are reasonable in light to the purpose of this EULA and circumstances of the changes. At the time of change, Anritsu will inform you of those changes and its effective date, as a general rule 45 days, in advance on its website, or in writing or by e-mail.

#### **8. Damages**

If Anritsu suffers any damage or loss, financial or otherwise, due to your violation of the terms of this EULA, Anritsu shall have the right to seek proportional damages from you.

#### **9. Negotiation for Dispute Resolution**

If matters of interpretational dispute or items not covered under this EULA arise, they shall be resolved by negotiations in good faith between you and Anritsu.

#### **10. Governing Law and Court of Jurisdiction**

This EULA shall be governed by and interpreted in accordance with the laws of Japan without regard to the principles of the conflict of laws thereof, and any disputes arising from or in relation to this EULA that cannot be resolved by negotiation described in Article 9 shall be subject to and be settled by the exclusive agreed jurisdiction of the Tokyo District Court of Japan.

#### **Revision History**

June 15, 2020

## Notes On Export Management

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This product and its manuals may require an Export License/Approval by the Government of the product's country of origin for re-export from your country.

Before re-exporting the product or manuals, please contact us to confirm whether they are export-controlled items or not.

When you dispose of export-controlled items, the products/manuals need to be broken/shredded so as not to be unlawfully used for military purpose.

## Trademark and Registered Trademark

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OpenFlow is a trademark or registered trademark of the Open Networking Foundation.

## Disposal Procedure

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This product incorporates a lithium battery and compound semiconductors that contain arsenic. Be sure to follow national and local laws when disposing of this product.

# About This Manual

This operation manual describes how to install and handle the PureFlow WS1 Traffic Shaper (hereafter referred to as “this device”).

This manual is applicable to the following models of this equipment:

- NF7501A

The operation manual of this device consists of the following four manuals. This document is <1>.

<1> Operation Manual (NF7500-W011E)

Describes the basic operation, maintenance procedures, common features, and common remote control operations.

<2> Command Reference (NF7500-W012E)

Describes in detail the commands used in this device.

<3> Configuration Guide (NF7500-W013E)

Describes the basic features of this device and provides specific examples of the settings required to build a network using these features.

<4> WebGUI Operation Manual (NF7500–W014E)

Describes the operation for setting and display of this device using a Web browser.

If the following documents related to this device or other documents related to the features of this device are issued, be sure to read them:

Release notes

(For details of the issuance of release notes, contact your dealer.)

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# Chapter 1 Overview

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This chapter provides an overview of this device and describes the device configuration.

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## **1.1 Overview**

This device is installed on a network communication path to control traffic based on the user's network policy. This device can be placed on a table or installed in a rack.

Figure 1.1-1 shows an external view from the top, looking at the front of this device.

Figure 1.1-2 shows an external view from the top, looking at the rear of this device.

Figure 1.1-3 shows a front view of this device.

Figure 1.1-4 shows a rear view of this device.

For details about the parts of this device, see Section 1.3 "Part names and functions".

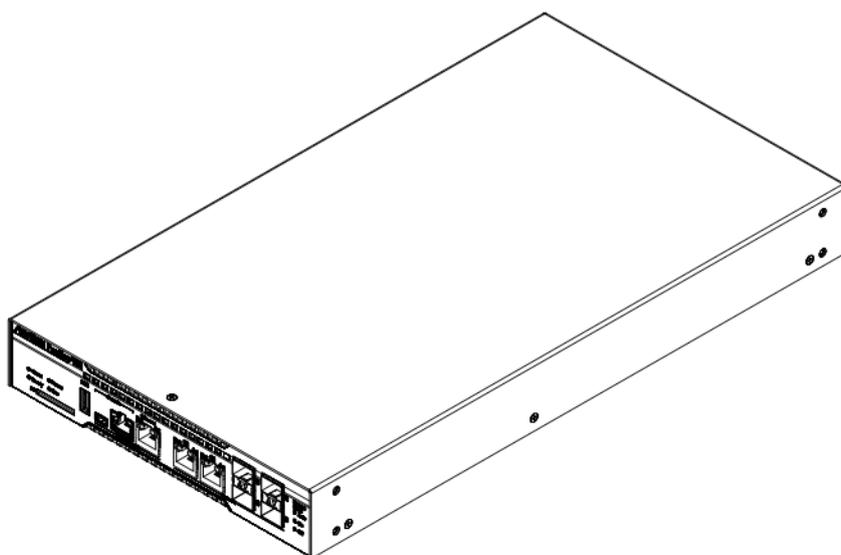


Figure 1.1-1 Top view from the front

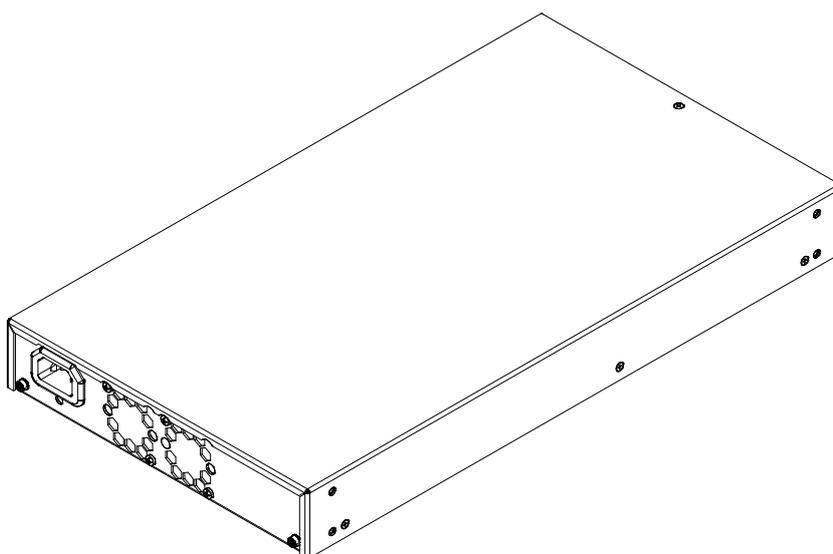


Figure 1.1-2 Top view from the rear

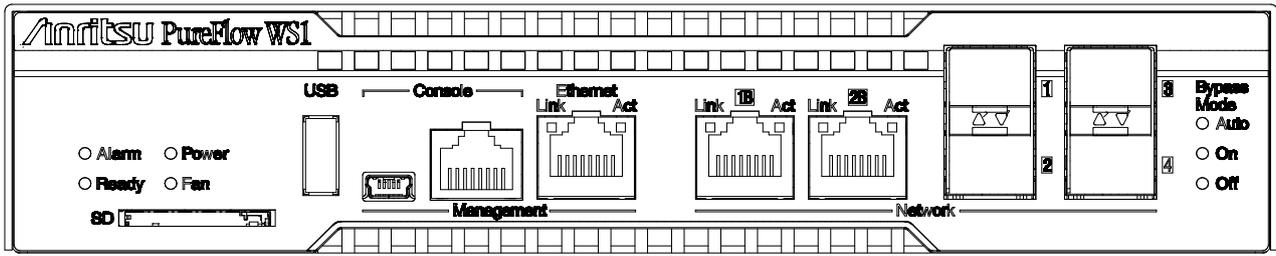


Figure 1.1-3 Front view

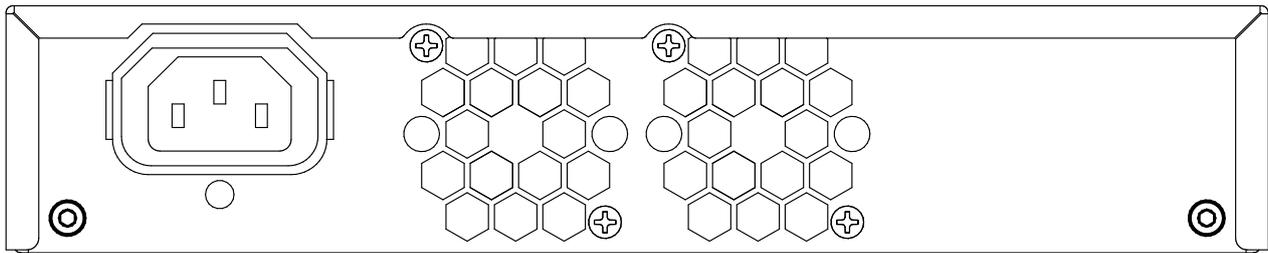


Figure 1.1-4 Rear view

## 1.2 Device configuration

### 1.2.1 Main unit configuration

This device is configured as shown below.

**Table 1.2.1-1 Main unit**

Model name	Item name	Remark
NF7501A	Traffic Shaper	PureFlow WS1

**Table 1.2.1-2 Standard accessories**

Model name	Item name	Qty.	Remark
—	SFP cage plug	4	Pre-installed
—	SD cap	1	For SD card slot Pre-installed
—	USB cap	1	For USB port Pre-installed
NF7500-W002A	Safety Manual	1	Booklet
—	Rubber pad	4	
—	AC power cord clamp	1	
—	Getting Started Guide	1	Form

**Table 1.2.1-3 Software**

Model name	Item name	Remark
NF7500-S001A	NF7500 series software	Included in the main unit

**Note:**

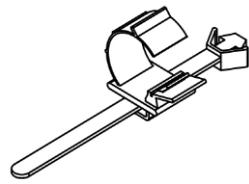
The SFP module, and AC power cord are not supplied as standard. Purchase them separately by referring to Table 1.2.3-1 “Option list”.

 **WARNING**

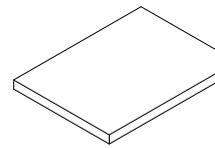
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Be sure to purchase an AC power cord in the country in which you are using this device. If you use a cord purchased in another country, it may emit smoke or catch fire, causing a serious accident. Cords purchased in other countries may also violate the laws and/or regulations of the country in which this device is being used.

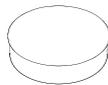
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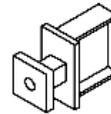
AC power cord clamp



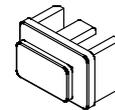
SD cap



Rubber pad



USB cap



SFP cage plug

Figure 1.2.1-1 Appearance of standard accessories

## 1.2.2 Main unit overview

### (1) NF7501A

This is a Traffic Shaper equipped with a Network port compliant with RJ-45 and SFP.

An SFP module can be connected to the Network port (SFP). PureFlow WS1 provides a transfer bandwidth of 100 Mbit/s and of the number of scenarios 2,048 as standard. The transfer bandwidth can be expanded to 1 Gbit/s and the number of scenarios can be expanded to 4,096 by using the license key options.

### 1.2.3 Option list

The following option parts and license key options are provided for this device.

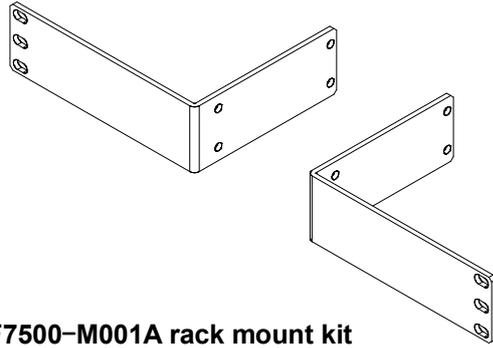
Table 1.2.3-1 shows the optional parts, and Table 1.2.3-2 shows the license key options for this device.

For how to use the license key, read "Command Reference (NF7500-W012E)" and "Configuration Guide (NF7500-W013E)".

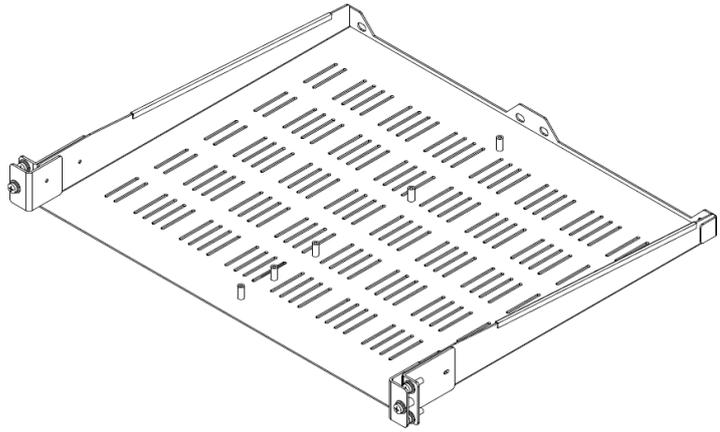
**Table 1.2.3-1 Option list**

Model name	Item name	Remark
NF7500-M001A	Rack mount kit	For mounting one unit of this device
NF7500-M002A	Rack mount tray	For mounting two units of this device
NY02003A	SFP Module (10/100/1000BASE-T)	A module for 1 Gbit/s twisted pair cable compliant with IEEE Std 802.3-2012.
NY02004A	SFP Module (1000BASE-SX)	An optical module for 1 Gbit/s MMF compliant with IEEE Std 802.3-2012.
NY02005A	SFP Module (1000BASE-LX)	An optical module for 1 Gbit/s SMF compliant with IEEE Std 802.3-2012.
NY10002A	USB memory (8GB)	USB memory whose operation is guaranteed by Anritsu.
NY10003A	SD card (1GB)	SD card whose operation is guaranteed by Anritsu.
NY06004A	Console cable	RJ-45/DB-9 Adapter Cable
NY01001A	AC Power Cord for USA	Length 2.5 m <sup>*1</sup>
NY01004A	AC Power Cord for Japan	Length 3.0 m <sup>*1</sup>

\*1: Purchase this when purchasing the main unit or power supply unit.



NF7500-M001A rack mount kit



NF7500-M002A rack mount tray

Figure 1.2.3-1 Appearance of optional accessories

Table 1.2.3-2 License key options

Model name	Item name	Remark
NF7500-L111A	200M Bandwidth License	Expands the transfer bandwidth per port from 100 Mbit/s to 200 Mbit/s.
NF7500-L112A	400M Bandwidth License	Expands the transfer bandwidth per port from 100 Mbit/s to 400 Mbit/s.
NF7500-L113A	700M Bandwidth License	Expands the transfer bandwidth per port from 100 Mbit/s to 700 Mbit/s.
NF7500-L114A	1G Bandwidth License	Expands the transfer bandwidth per port from 100 Mbit/s to 1 Gbit/s.
NF7500-L115A	200M to 400M Bandwidth License	Expands the transfer bandwidth per port from 200 Mbit/s to 400 Mbit/s.
NF7500-L116A	400M to 700M Bandwidth License	Expands the transfer bandwidth per port from 400 Mbit/s to 700 Mbit/s.
NF7500-L117A	700M to 1G Bandwidth License	Expands the transfer bandwidth per port from 700 Mbit/s to 1G bit/s.
NF7500-L121A	4k Scenario Expansion License	Expands the number of available scenarios from 2,048 to 4,096.
NF7500-L131A	OpenFlow function license	OpenFlow function is usable.
NF7500-L201A	TCP acceleration function license	TCP acceleration function is usable.
NF7500-L211A	FEC function license	FEC function is usable.

The following specifications apply if no license options are used:

Bandwidth: 100 Mbit/s

Number of scenarios: 2,048

FEC function: Unavailable

OpenFlow function: Unavailable

TCP acceleration function: Unavailable

## 1.2.4 Overview of options

(1) **NF7500-M001A Rack Mount Kit**

This kit is used as a bracket to mount this device in a 19-inch rack. One unit of this device can be implemented per rack. The rack mount kit consists of mounting brackets (two pieces), pan head screws (M4) (four pieces), and pan head screws (M5) (four pieces).

(2) **NF7500-M002A Rack Mount Tray**

This is a tray to mount this device in a 19-inch rack. Two units of this device can be implemented per rack. The rack mount tray consists of tray (one piece), adapter brackets (two pieces), flat head screws (M4) (four pieces), and pan head screws (M5) (six pieces)

(3) **NY02003A SFP Module (10/100/1000BASE-T)**

This is a 10BASE-T/100BASE-TX/1000BASE-T SFP module that can be connected to the Network port (SFP) of this device. This module complies with IEEE Std 802.3–2012 and allows up to 1 Gbit/s communication. Model name "NY02003A" is printed on the back surface label of the SFP module.

(4) **NY02004A SFP Module (1000BASE-SX)**

This is a 1000BASE-SX SFP module that can be connected to the Network port (SFP) of this device. This module complies with IEEE Std 802.3–2012 and allows up to 1 Gbit/s communication. Model name "NY02004A" is printed on the back surface label of the SFP module.

(5) **NY02005A SFP Module (1000BASE-LX)**

This is a 1000BASE-LX SFP module that can be connected to the Network port (SFP) of this device. This module complies with IEEE Std 802.3–2012 and allows up to 1 Gbit/s communication. Model name "NY02005A" is printed on the back surface label of the SFP module.

(6) **NY10002A USB Memory (8GB)**

This is a USB Memory that can be inserted in the USB port of this device. It can be used to update this device firmware and upload and download the configuration settings. Model name "NY10002A" is printed on the label of the USB Memory.

(7) **NY10003A SD Card (1GB)**

This is an SD card that can be inserted in the SD card slot of this device. It can be used to update this device firmware and upload and download the configuration settings. The model name "NY10003A" is printed on the rear surface label of the SD card.

(8) **NY06004A Console Cable**

This cable is used only for this device when connecting this device to the console port (RJ-45) to set and check this device.

(9) **NF7500-L111A 200M Bandwidth License**

This expands the transfer bandwidth per Network port from 100 Mbit/s to 200 Mbit/s. License certificate will be provided with the purchase.

**(10) NF7500-L112A 400M Bandwidth License**

This expands the transfer bandwidth per Network port from 100 Mbit/s to 400 Mbit/s. License certificate will be provided with the purchase.

**(11) NF7500-L113A 700M Bandwidth License**

This expands the transfer bandwidth per Network port from 100 Mbit/s to 700 Mbit/s. License certificate will be provided with the purchase.

**(12) NF7500-L114A 1G Bandwidth License**

This expands the transfer bandwidth per Network port from 100 Mbit/s to 1 Gbit/s. License certificate will be provided with the purchase.

**(13) NF7500-L115A 200M to 400M Bandwidth License**

This expands the transfer bandwidth per Network port from 200M bit/s to 400 Mbit/s. NF7500-L111A 200M Bandwidth License must be installed in advance. License certificate will be provided with the purchase.

**(14) NF7500-L116A 400M to 700M Bandwidth License**

This expands the transfer bandwidth per Network port from 400 Mbit/s to 700 Mbit/s. NF7500-L112A 400M Bandwidth License, or NF7500-L111A 200M Bandwidth License and NF7500-L115A 200M to 400M Bandwidth License must be installed in advance. License certificate will be provided with the purchase.

**(15) NF7500-L117A 700M to 1G Bandwidth License**

This expands the transfer bandwidth per Network port from 700 Mbit/s to 1 Gbit/s. NF7500-L113A 700M Bandwidth License, or NF7500-L112A 400M Bandwidth License and NF7500-L116A 400M to 700M Bandwidth License, or NF7500-L111A 200M Bandwidth License and NF7500-L115A 200M to 400M Bandwidth License and NF7500-L116A 400M to 700M Bandwidth License must be installed in advance. License certificate will be provided with the purchase.

**(16) NF7500-L121A 4k Scenario Expansion License**

This expands the number of scenario resources from 2,048 to 4,096. A license certificate will be provided with the purchase.

**(17) NF7500-L131A OpenFlow Function License**

This enables you to use the OpenFlow function. A license certificate will be provided with the purchase.

**(18) NF7500-L201A TCP Acceleration Function License**

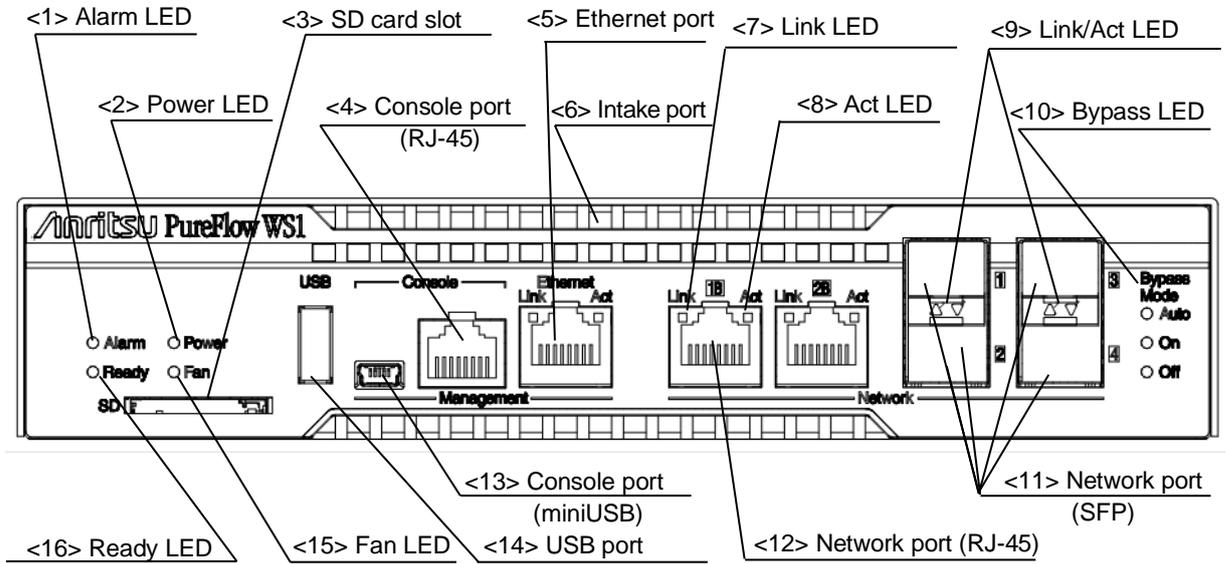
This enables you to use the TCP acceleration function. A license certificate will be provided with the purchase.

**(19) NF7500-L211A FEC Function License**

FEC function is usable. This license applies to NF7501A to which the TCP acceleration function license applies. A license certificate will be provided with the purchase.

# 1.3 Part names and functions

Figure 1.3-1 shows a front view of this device indicating the part names. Figure 1.3-2 shows a rear view of this device indicating the part names.



**Figure 1.3-1 Front view of device with part names**

**<1> Alarm LED**

This LED indicates that an error has occurred in this device.

Indication	Meaning
Red (on)	A device error has occurred.
Off	This device is operating normally.

**<2> Power LED**

These LEDs indicate the supply status of the power supply.

Indication	Meaning
Green (on)	Power is being supplied to this device.
Off	Power is not being supplied to this device.

**<3> SD card slot**

This is used for downloading or uploading the configuration settings and software. For details of the operation method, refer to the "Configuration Guide (NF7500-W013E)".

Use our optional SD card.

For details, refer to "2.9 Inserting and removing the SD card".

<4> Console port (RJ-45)

This port is used as an interface for managing this device.

This port is used to connect the optional NY06004A console cable, display the operation parameters of this device in the terminal, and set the device.

For details, refer to "3.2 Settings".



## CAUTION

---

**Do not connect the Network port to a telecommunications network such as a public switched telephone network. Incorrect connection may result in failure of the communication line or device.**

---

<5> Ethernet port

This port is used as an interface for managing this device.

This port is an Auto-MDIX port and supports 10BASE-T, 100BASE-TX, and 1000BASE-T.

It is a local port of this device and is separate from the Network port.

Link LED: Indicates the link status of the Ethernet port.

Indication	Meaning
Green (on)	The port is linked at 1000BASE-T.
Orange (on)	The port is linked at 100BASE-TX or 10BASE-T.
Off	The port is not linked to the network device connected to the port.

Act LED: Indicates the packet transmission/reception status of the Ethernet port.

Indication	Meaning
Green (blinking)	The port is transmitting or receiving packets.
Off	The port is not transmitting or receiving packets.



## CAUTION

---

**Do not connect the Ethernet port to a telecommunications network such as a public switched telephone network. Incorrect connection may result in failure of the communication line or device.**

---

## &lt;6&gt; Intake port

This is used for intaking air to cool down this device.  
For details about the open space around this device required for cooling this device, see Section 2.3 “Open space”.

## &lt;7&gt; Link LED

Indicates the link status of the Network port (RJ-45).

Display	Function
Green (on)	The port is linked at 1000BASE-T.
Orange (on)	The port is linked at 100BASE-TX or 10BASE-T.
Off	The port is not linked to the network device connected to the port.

## &lt;8&gt; Act LED

Indicates the packet transmission/reception status of the Network port (RJ-45).

Display	Function
Green (blinking)	The port is transmitting or receiving packets.
Off	The port is not transmitting or receiving packets.

## &lt;9&gt; Link/Act LED

Indicates the link status and packet transmission/reception status of the Network port (SFP).

Display	Function
Green (on)	The Network port (SFP) is linked.
Green (blinking)	The Network port (SFP) is transmitting or receiving packets.
Off	The port is not linked to the network device connected to the port.

<10>Bypass LED

This LED indicates the bypass conditions and settings of <12> the Network port (RJ-45).

Auto LED

Display	Function
Green (on)	The bypass is set to Auto.
Off	The bypass is not set to Auto.

On LED

Display	Function
Green (on)	The Network port (RJ-45) of this device is in the bypass condition.
Off	The Network port (RJ-45) of this device is not in the bypass condition.

Off LED

Display	Function
Green (on)	The equipment is not in the bypass condition.
Off	The equipment is in the bypass condition.

Either of On LED or Off LED is always on.

<11>Network port (SFP)

This port complies with SFP, and supports the following: Ports 1 and 2 can be switched with <12> the Network port (RJ-45) in a port unit for use.

- SFP module  
10/100/1000BASE-T (NY02003A)  
1000BASE-SX (NY02004A)  
1000BASE-LX (NY02005A)

## &lt;12&gt;Network port (RJ-45)

This port is used to connect a line whose traffic is to be controlled. The network bypass function is available.

Ports 1 and 2 can be switched with <11> the Network port (SFP) in a port unit for use.

 **CAUTION**

- 1. Do not connect the Network port to a telecommunications network such as a public switched telephone network. Incorrect connection may result in failure of the communication line or device.**
- 2. If the Network port (SFP) is used, the Network port (RJ-45) is disabled. If the Network port (RJ-45) is used, the Network port (SFP) is disabled.**
- 3. The network bypass function is enabled only for the Network port (RJ-45). To use the Network port (RJ-45) in combination with the Network port (SFP), communication is not established in the network bypass state. Use these ports in combination while the bypass setting is "OFF".**

## &lt;13&gt;Console port (miniUSB)

This port is used as an interface for managing this device. This port is used to display the operation parameters of this device in the terminal, and to set the device. For details of the settings, refer to "3.2 Settings".

Connect a commercially available miniUSB/USB conversion cable. To connect this port, a USB serial driver is required for the terminal. When a commercially available miniUSB/USB conversion cable is connected to this port, the driver is automatically installed to the terminal. If the driver is not installed, download the FT232R driver from the website of FTDI, and install it to the terminal.

FTDI website: <http://www.ftdichip.com/>

## &lt;14&gt;USB port

This is used for downloading or uploading the configuration settings and software. For details of the operation method, refer to "Configuration Guide (NF7500-W013E)".

Use our optional USB memory.

For details, refer to "2.10 Connecting and removing the USB memory".

<15> Fan LED

These LEDs indicate the status of the fans in this device.

Indication	Meaning
Green (on)	The fan is operating normally.
Green (blinking)	An error has occurred in the fan.
Off	Power is not being supplied to this device.

<16> Ready LED

Indicates the operational status of the entire device.

Indication	Meaning
Green (blinking)	This device is starting up or is undergoing self diagnosis.
Green (on)	This device is operating normally.
Off	No power is being supplied to this device or an error has been detected in this device.

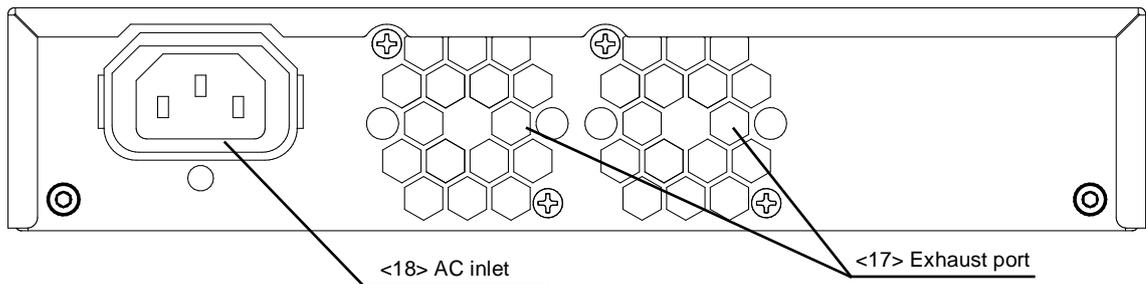


Figure 1.3-2 Rear view of device with part names

<17> Exhaust port

The built-in fan exhausts air from inside of this device.

For details about the open space around this device required for cooling this device, see Section 2.3 “Open space”.

**CAUTION**

**Do not block the exhaust port. Otherwise, this device may overheat, stop, or fail.**

<18>AC inlet

This is used for connecting the AC power cord.



## **WARNING**

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**Use the dedicated AC power cord. Use of other types of AC power cord may result in electric shock, heat generation, smoke, or ignition, leading to fire, injury, or death.**

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# Chapter 2 Unpacking and Installation

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This chapter describes how to unpack and install this device.

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## 2.1 Unpacking

### 2.1.1 How to unpack this device

- (1) Open the packing box, and pull out the top box including the accessories from the packing box.
- (2) Securely support this device by holding both the side surfaces and the bottom.
- (3) Pull out the device from the packing box.
- (4) Remove the cushions from the front and rear of this device.

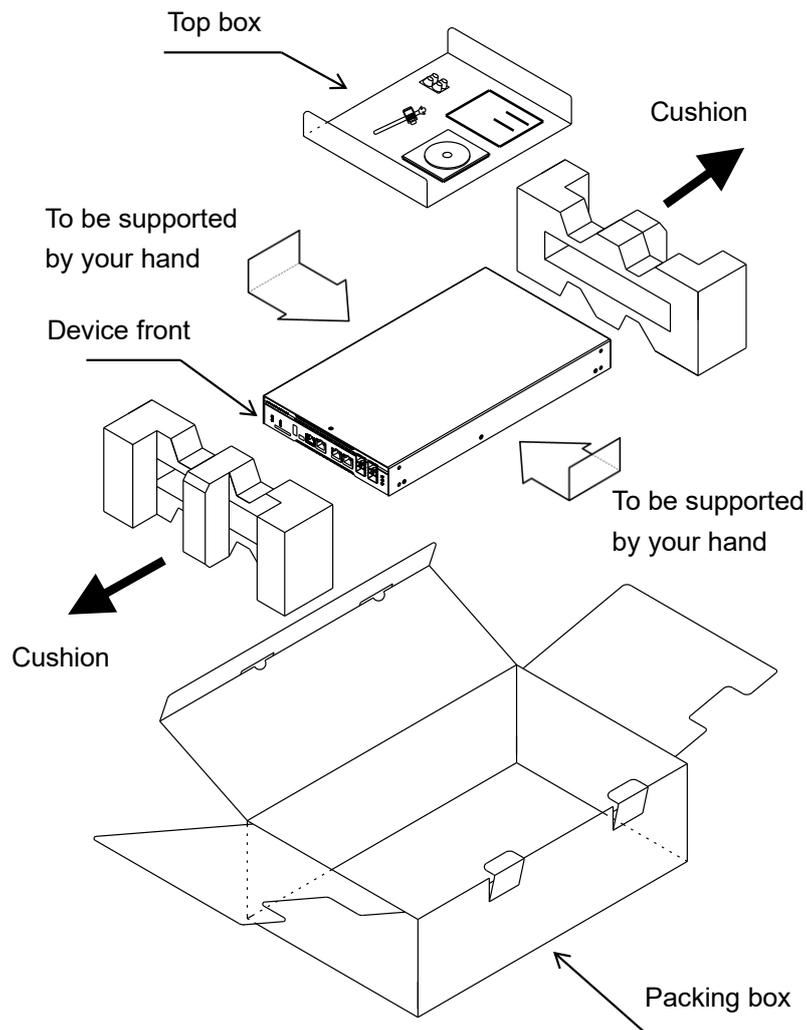


Figure 2.1.1-1 How to unpack this device

## 2.1.2 Checking the contents of the box

Remove the contents from the packing box, and check that the following items are included. If any item is missing or has been damaged during transportation, contact your dealer immediately.

**Keep the packing materials such as the packaging box for future transportation.**

**Table 2.1.2-1 Contents list**

Model name	Item name	Qty.	Remark
NF7501A	Traffic Shaper (device main unit)	1	
—	SFP cage plug	4	(Pre-installed)
—	SD cap	1	For SD card slot (Pre-installed)
—	USB cap	1	For USB port (Pre-installed)
NF7500-W002A	Safety Manual	1	Booklet
—	Rubber pad	4	
—	AC Power Cord Clamp	1	
—	Getting Started Guide	1	Paper

## 2.2 Selecting an installation location

Avoid the following places when installing this device:

- In places of direct sunlight
- In dusty places
- Outdoors
- In liquids, such as water, oil, or organic solvents, and medical fluids, or places where these liquids may adhere
- In salty air or in place chemically active gases (sulfur dioxide, hydrogen sulfide, chlorine, ammonia, nitrogen dioxide, or hydrogen chloride etc.) are present
- In places where high-intensity static electric charges or electromagnetic fields are present
- In places where abnormal power voltages (high or low) or instantaneous power failures occur
- In places where condensation occurs
- In the presence of lubricating oil mists
- In places at an altitude of more than 2,000 m
- In the presence of frequent vibration or mechanical shock

---

 **WARNING**

---

Installing this device in a place such as those above might cause the device to fall over or fall, or cause an electric shock, fire, or failure.

---

---

 **CAUTION**

---

When carrying this device, hold the bottom firmly in your hands. If holding anywhere other than the bottom, the device may slip and drop, resulting in injury. Additionally, the device may be damaged.

---

## 2.3 Open space

Allow space of 50 mm or larger at the front and rear of this device to ensure that the inside this device is cool. And allow space of 90 mm or larger partially for the cables. This device has a cooling fan in the back. The fan takes air in from the front and exhausted air from the rear of this device.

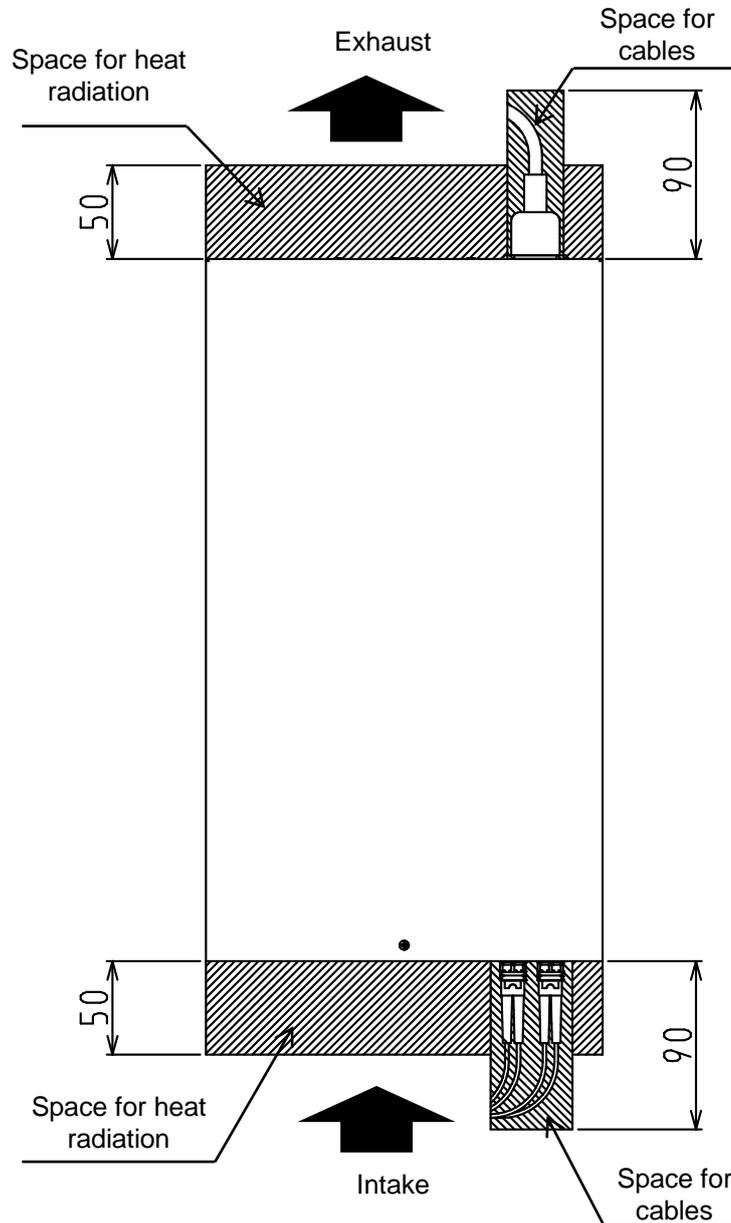


Figure 2.3-1 Open space



### CAUTION

Do not block the intake port and exhaust port. Allow space shown in Figure 2.3-1. If the space around this device is not sufficient, this device will overheat, causing failure.

## 2.4 Installing the main unit

### 2.4.1 Placing this device on a table

Do not place any object on this device. Also avoid stacking devices (other devices, including the same model, can be mounted directly on or under this device when using rack mounting).

When using this device on a table, you can attach the supplied rubber pad. Attach the rubber pad as follows:

- (1) Wipe off any dirt on the rubber pad areas on the bottom of this device (the punch marks in Figure 2.4.1-1) with a cloth.
- (2) Remove the adhesive protection seal on the supplied rubber pad, and affix the pad (the punch marks in Figure 2.4.1-1).

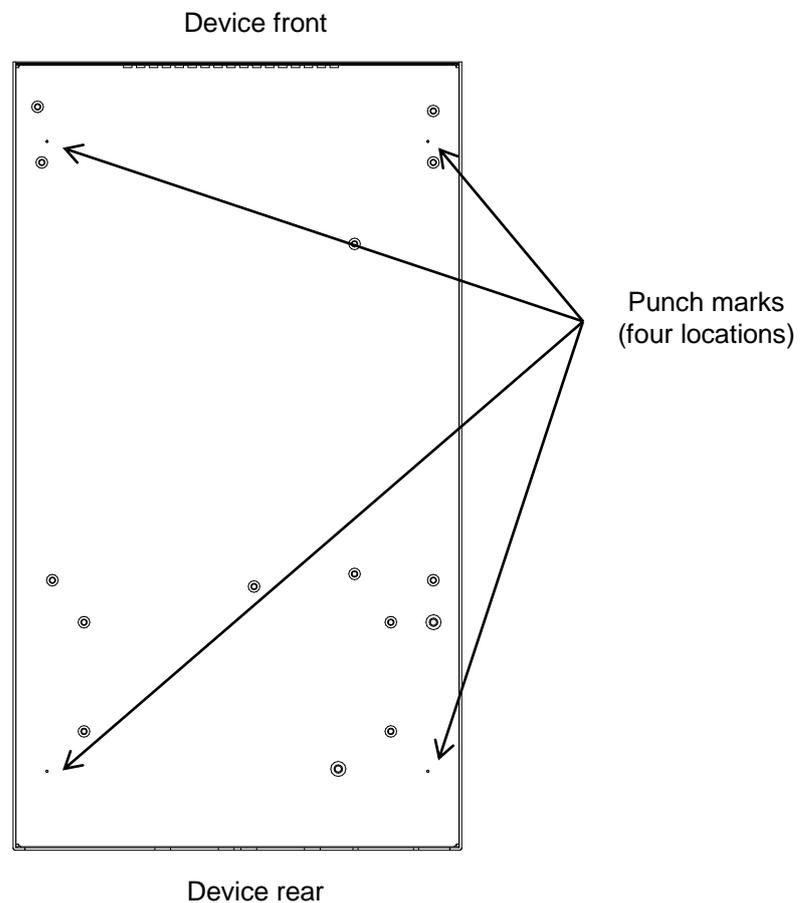


Figure 2.4.1-1 Punch marks for rubber pad

---

 **CAUTION**

**Do not use this device in a vertical position. This device will overheat, causing failure. Always use it in a horizontal position.**

---

## 2.4.2 Mounting this device in a 19-inch rack

When mounting this device in a 19-inch rack, use the optional rack mount kit or rack mount tray. The installation holes of the rack mount kit comply with EIA, IEC, and JIS. The installation holes of the rack mount tray comply with EIA and IEC.

---

### WARNING

Use the dedicated AC power cord when installing this device. Use of other types of AC power cord may result in heat generation, leading to fire.

When connecting this device to a power circuit, always provide proper protective grounding. Provide unbroken and secure protective grounding from the main power supply to the AC power cord of this device. Otherwise, electric shock may occur.

---

---

### CAUTION

1. Do not install this device in a place where the operating ambient temperature exceeds 40°C. Otherwise, the device may fail.
  2. Be careful not to block the air flow from the front to the back of this device (see Figure 2.3-1 “Open space”). Otherwise, this device may fail.
  3. If anything other than the specified rack mount hardware or screws are used, or if the installation procedure shown below is not followed, this device might fall off the rack, causing injury or device failure.
  4. When installing multiple units of this device on a rack with other devices, make sure that the total current capacity does not exceed the capacity of the power circuit, lines, and overcurrent protective device provided on the rack. Add up all the current rating values listed on the nameplates of all the devices connected to the power circuit, and determine the current capacity of the power circuit so that it will not result in an overload. The rated current value of one unit of this device is 0.8 A at 100 V. The power circuit breaker may trip and system failure may occur due to lack of power capacity.
-

### 2.4.2.1 Mounting only one unit in the 1U space

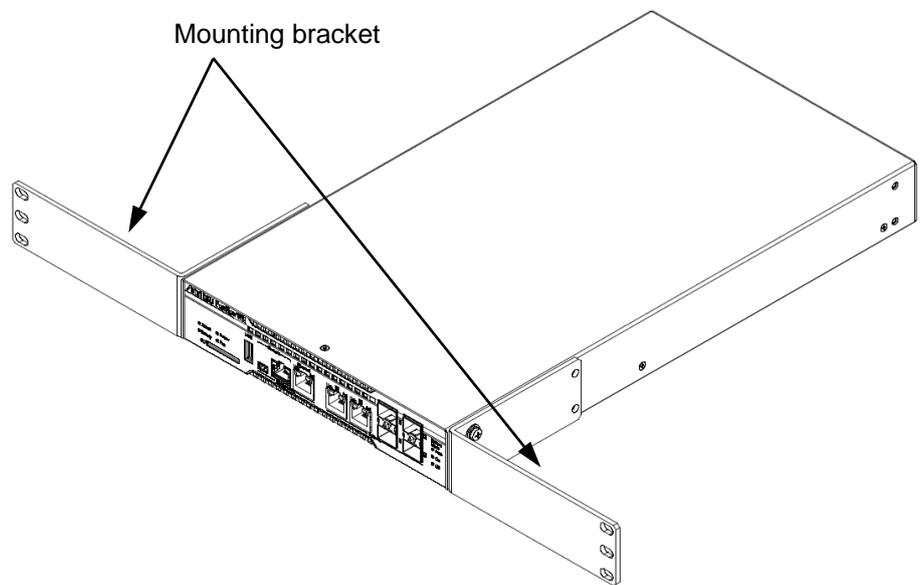
If one unit of this device is installed in the 1U space, use the rack mount kit provided as an option of this device.

(1) Mounting this device on the rack mount kit

Install the mounting bracket. Be sure to use the attached pan head screws (M4) for installation. Figure 2.4.2.1-1 shows the installation method.

**Note:**

Use the attached pan head screws (M4) at 2 places on each side (4 places in total).



**Figure 2.4.2.1-1 Installing mounting brackets**

The positions where the mounting brackets are installed can be adjusted in the front-to-rear direction by using the screw hole separately.

Choose the installation holes from <1> and <2> below that match your environment.

- <1> Standard position of flush against the mounting surface (Figure 2.4.2.1-2)
- <2> 82 mm rearward from the standard position (Figure 2.4.2.1-3)

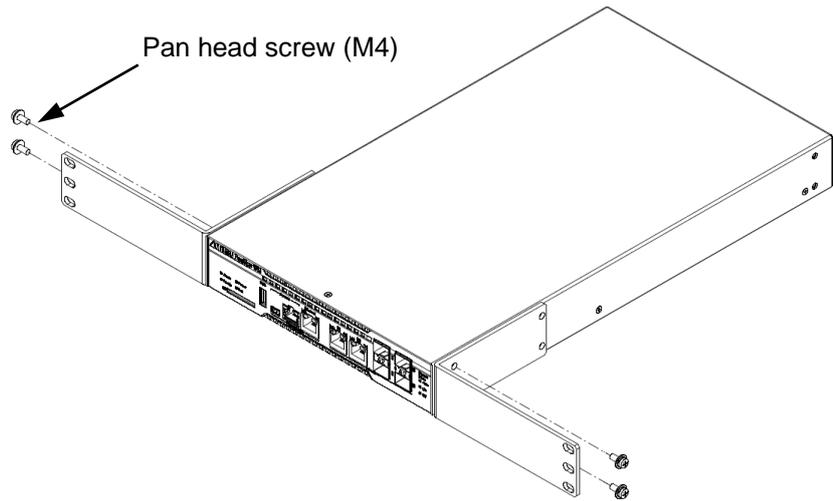


Figure 2.4.2.1-2 Installation hole position (standard position)

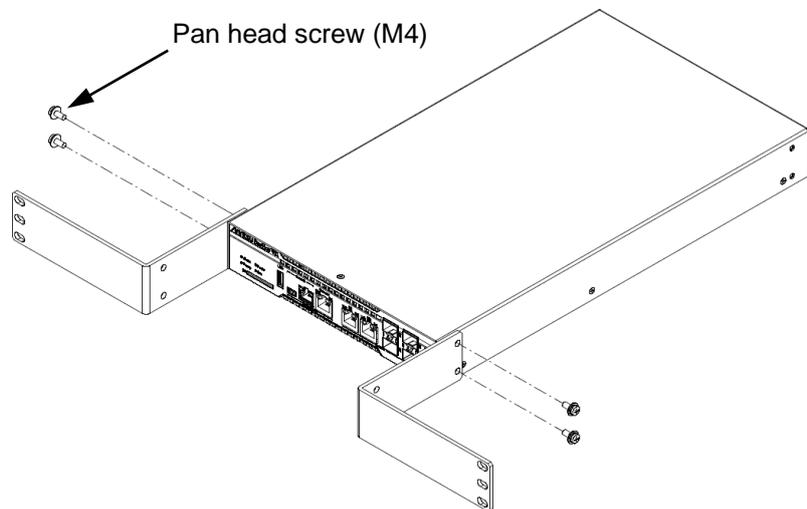


Figure 2.4.2.1-3 Installation hole position (rear position)



## CAUTION

Use the supplied screws. Using incorrect screws may cause the device to fall off, cause failure.

Use two supplied installation screws on each side.

The installation holes vary depending on the installation position. Choose the appropriate position.

(2) Mounting and securing this device

Fix the mounting bracket to the rack, and mount the device to the rack. Pan head screws (M5) are attached for installation to the rack. If the rack is not compatible with the M5 screws, please use appropriate screws.

Figure 2.4.2.1-4 shows an example of mounting this device in a 19-inch rack that meets EIA and IEC.

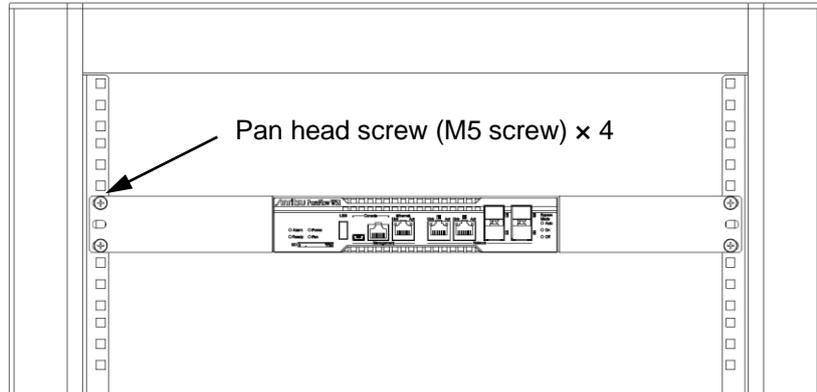


Figure 2.4.2.1-4 Mounting this device in a 19-inch rack that meets EIA and IEC

**Note:**

Fix the mounting screws that total of four by two on each side.

Figure 2.4.2.1-5 shows an example of mounting this device in a 19-inch rack that meets JIS.

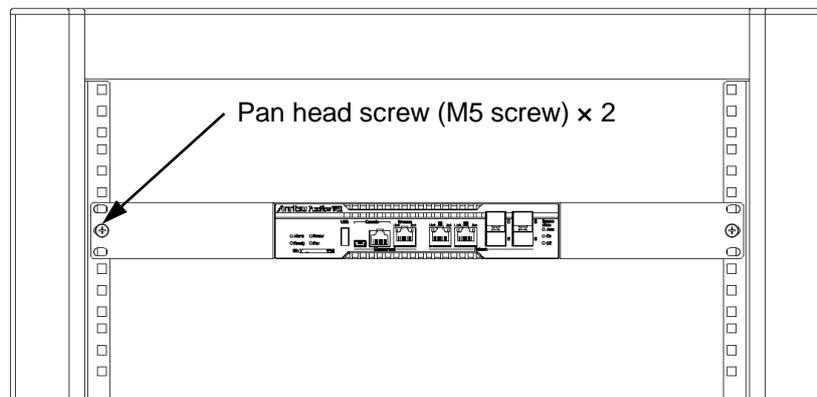


Figure 2.4.2.1-5 Mounting this device in a 19-inch rack that meets JIS

**Note:**

Fix the mounting screws that total of two by one on each side.

 **CAUTION**

---

Do not hold the protrusions or grooves on the front and rear sides of this device. They are slippery and you might drop the device, causing injury.

---

### 2.4.2.2 Mounting two units in the 1U space

If two units of this device are installed in the 1U space, use the rack mount tray provided as an option of this device.

#### (1) Mounting the rack mount tray

Mount the tray in the rack. Pan head screws (M5) are attached for installation to the rack. If the rack is not compatible with the M5 screws, please use appropriate screws. Use the screws at 2 places on each side (4 places in total). Note that the rack mount tray is used only for NF7501A. Do not use this tray for other typ.

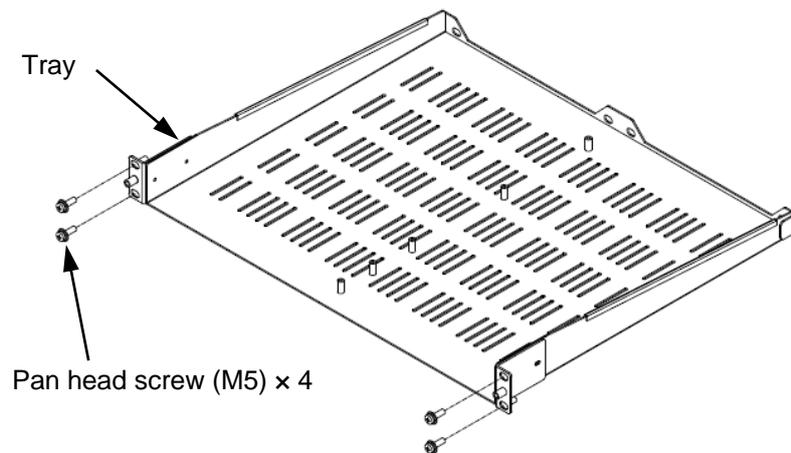


Figure 2.4.2.2-1 Mounting the tray

#### (2) Mounting the adapter bracket

Install the adapter bracket to this device. Install the bracket to the right-hand side surface of the device placed on the right-hand side of the tray; and install the bracket to the left-hand side surface of the device placed on the left-hand side of the tray. The adapter bracket can be shared on both sides. Be sure to use the attached flat head screw (M5) for to fix the adapter brackets, and use two screws per bracket to fix it.

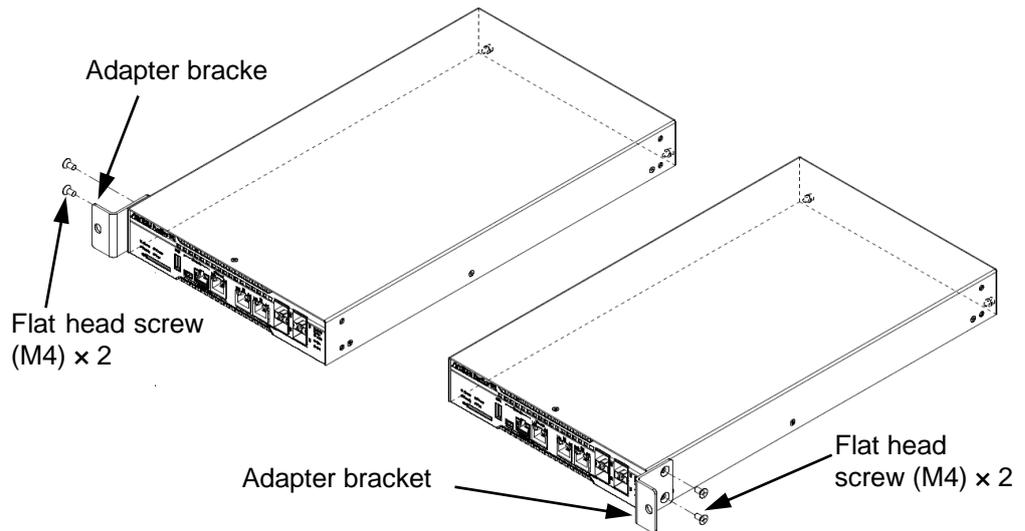


Figure 2.4.2.2-2 Mounting the adapter bracket

(3) Mounting and fixing the device

Place the device on the rack mount tray, and then press it slowly to the back until it stops. If the device is fully pressed to the back, the protrusion (hexagon socket head screw) on the back side of the device fits in the long hole on the back side of the tray. After that, fix the adapter bracket and tray with screws. Be sure to use the attached pan head screw (M5) for fixing the adapter brackets, and use one piece of the screw per bracket for fixing it.

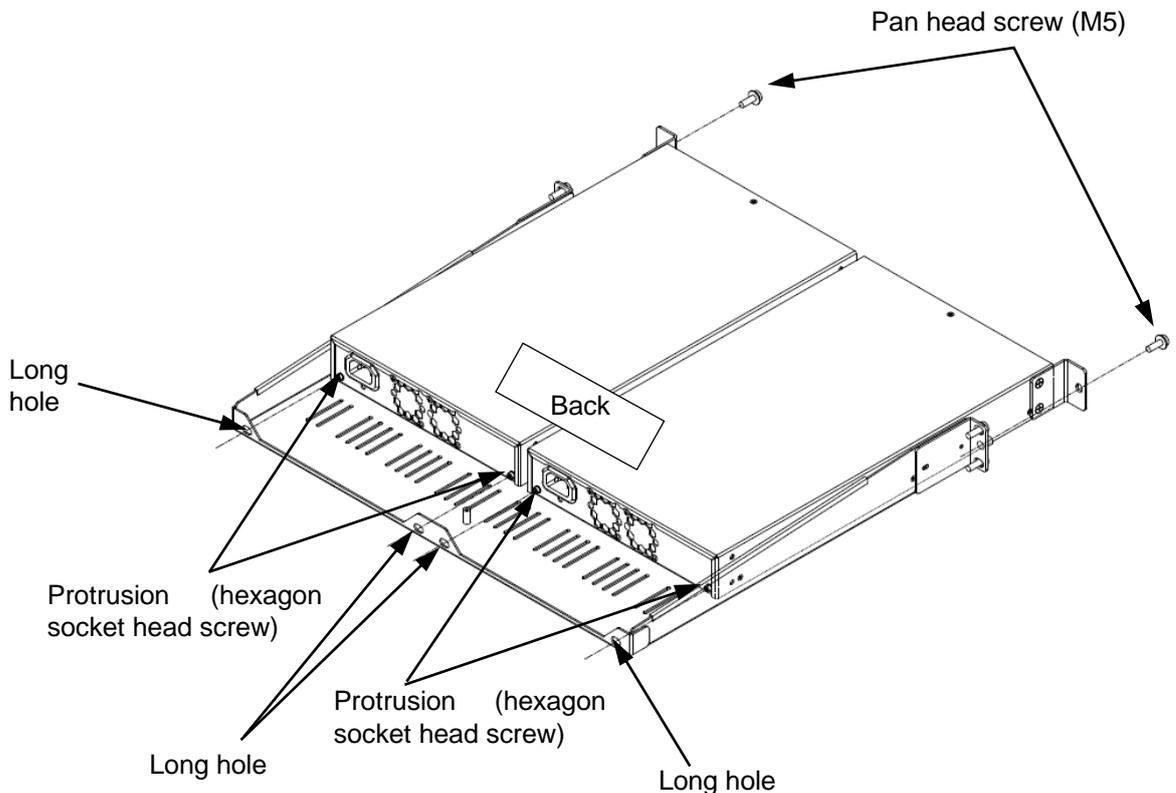


Figure 2.4.2.2-3 Mounting the device to the tray

## 2.5 Network Connection Procedure

For Network ports 1/1 or 1/2 of this device, RJ-45 (1B and 2B) or SFP can be selected as the media type for each port. At shipment, this device is set for the Network port (RJ-45). If the Network port (SFP) is used, set the device for it after startup.

The following table shows the combination of the ports compatible with this device and network device functions.

Network port 1/1	Network port 2/2	Remarks
RJ-45 (1B)	RJ-45 (2B)	Default setting The network device function is enabled.
RJ-45 (1B)	SFP	Communication is not established in the network bypass state. Keep the bypass "OFF".
SFP	RJ-45 (2B)	
SFP	SFP	Operates without being affected by the network bypass function.

\* The SFP ports for Network ports 1/3 and 1/4 operate without being affected by the network bypass settings.

When using a Network port (RJ-45), refer to "2.8 Connecting and removing the UTP cable" for how to connect the cable.

When using a Network port (SFP), refer to "2.6 Connecting and removing the SFP module" for how to connect the cable.

Use the "set bypass" command to set the network bypass. "Auto" is set at shipment. When using a Network port (SFP), set it to "off". For details, refer to "3.2.2 Setting a network port".

## 2.5.1 Network Bypass

This device is equipped with the network bypass function. In the case of abnormal operation of the device or by the command, this network changes to the bypass status.

For the conditions for shifting to the bypass status, refer to the "Configuration Guide (NF7500-W013E)".

The broken lines in the following figure indicate the communication path of the network bypass function.

1/1 (1B) and 1/2 (2B) of a Network port (RJ-45) inside the device are in the bypass status. In the bypass status, this works as the cross cable.

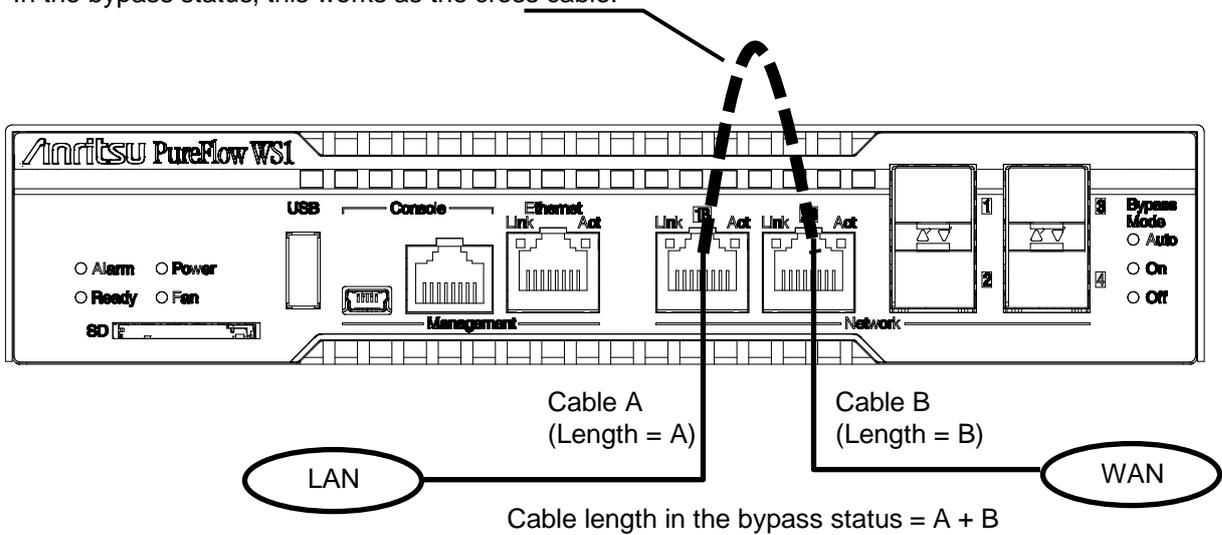


Figure 2.5.1-1 Network bypass function

**Notes:**

1. Even in the bypass status, be careful to prevent the communication cable length between this device and the opposed machines from exceeding the communication standard value.
2. Considering the loss inside the device and communication in the bypass status, it is recommended to adjust the length of the network cable to be connected to a Network port (RJ-45) to 60 m or less in total.

## 2.6 Connecting and removing the SFP module

The Network port (SFP) of this device is compatible with SFP. The SFP module is a transceiver module that enables hot swapping. The external view of the SFP module is shown below:

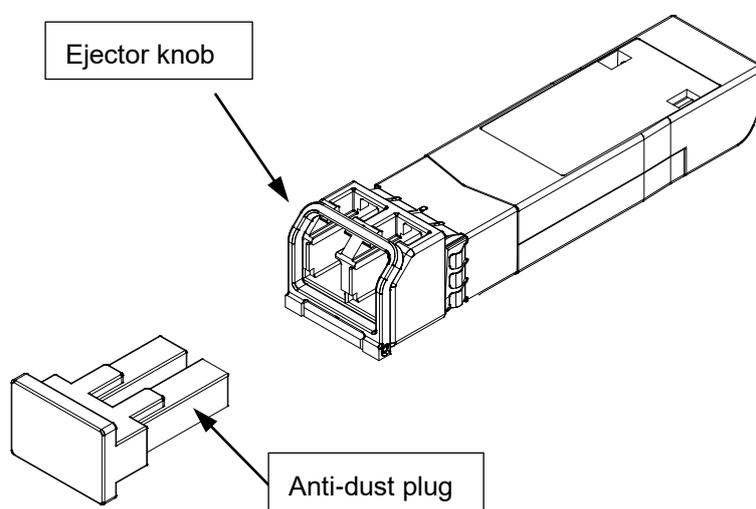


Figure 2.6-1 External view of SFP module (for LC connector)



### CAUTION

Use the optional SFP module. Using the incorrect optional SFP module is out of warranty. In addition, may cause failure.

Use the adapted SFP module to the communication standard of the opposing device and cable. Using the incorrect adapted SFP module is out of warranty. In addition, may cause failure.

**Note:**

Please refer to the Appendix A “I/O Interface Specifications” for details such as the communication standard and the type of cable and SFP module.

## 2.6.1 Cleaning SFP module and the optical fiber cable

Using an optical fiber cable with dust or dirt attached to the ferrule end surface may deteriorate the performance. Before using this device, sufficiently clean the optical fiber cable to be connected and the ferrule end surface of the SFP module.

### 2.6.1.1 Cleaning SFP module

Before installing the SFP module in the Network port (SFP), clean the optical cable fitting surfaces of SFP module and the ferrule end surfaces. For cleaning the ferrule end surface inside SFP module, use a commercially-available stick cleaner.

An example of a commercially-available stick cleaner is shown below:

<Procedure>

- (1) Insert the stick cleaner (for a  $\phi 1.25$  LC connector) in straight as shown in the figure below:
- (2) Lightly push the stick cleaner until the stick touch the end lightly and rotate it 4 to 5 times clockwise.  
\* Holding the support part allows the load to be transmitted easily.
- (3) Pull out the stick while rotating it clockwise.

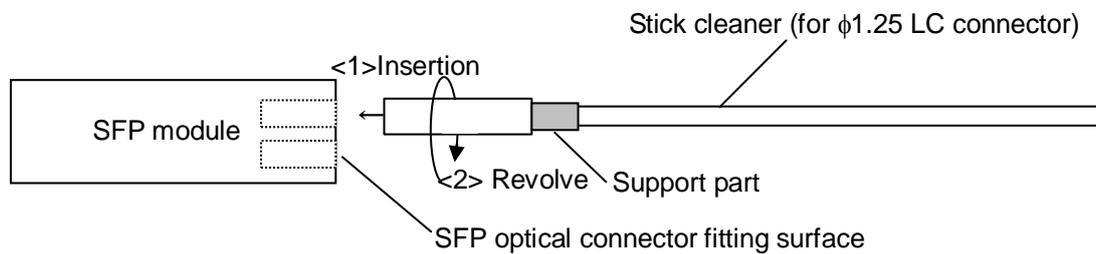


Figure 2.6.1.1-1 Example of the use of stick cleaner

---

 **CAUTION**

---

When cleaning and checking the ferrule end surface of the SFP module, remove it from this device. Laser light may enter your eyes, causing eye injury.

---

### 2.6.1.2 Cleaning the optical fiber cable

Before connecting the optical fiber cable, clean the ferrule end surface. For cleaning the ferrule of the optical fiber cable, use a commercially-available ferrule cleaner.

An example of a commercially-available ferrule cleaner is shown below:

<Procedure>

- (1) Pull the ferrule cleaner lever to pull out the cleaning surface.

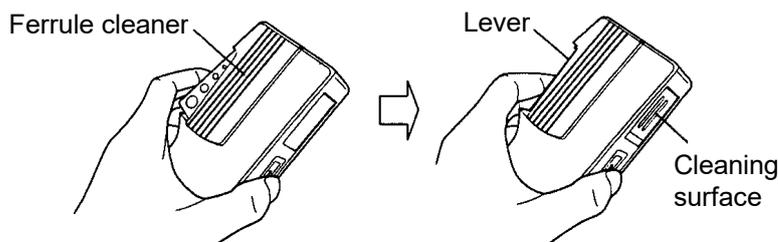


Figure 2.6.1.2-1 Example of the ferrule cleaner (1)

- (2) Hold the lever, push the ferrule end surface of the optical connector toward the cleaning surface, and scrub it in one direction.

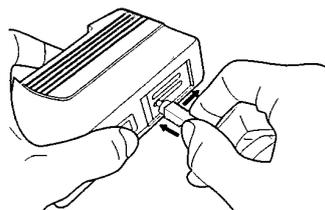


Figure 2.6.1.2-2 Example of the ferrule cleaner (2)

Precautions when cleaning

1. Do not use already-used cleaning surface.
2. Do not use a cotton-tipped stick since fibers might become attached to the ferrule.
3. Put a cap on the unused connector.

For details, see the manual of ferrule cleaner.



## CAUTION

Do not look into the connector portion of the optical fiber cable. Laser light may be emitted from the connected device, which might enter your eyes, causing eye injury.

## 2.6.2 Installing and removing SFP module

### 2.6.2.1 Installing SFP module

The SFP module can be inserted and removed without turning off this device. At this time, handle the SFP module with the SFP dust-proof plug.

<Procedure>

- (1) Remove the SFP cage plug of the Network port (SFP) to which the SFP module will be inserted.

**Note:**

Keep SFP cage plug for future use.

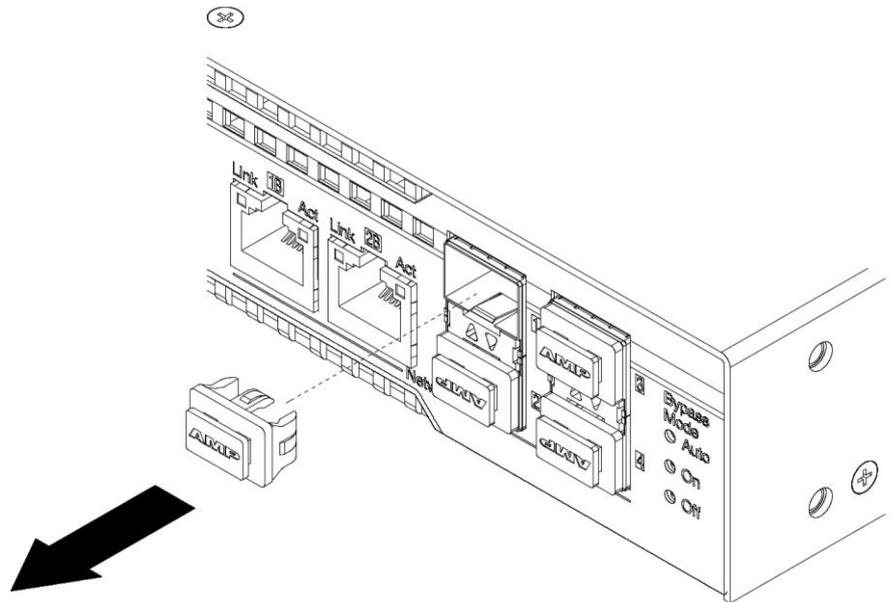


Figure 2.6.2.1-1 Removing the SFP cage plug

### CAUTION

---

When the SFP module is not installed to the Network port (SFP), do not remove the SFP cage plug to the Network port. Dust might enter the Network port. This may cause failure.

---

- (2) Install the SFP module to the upper Network port (SFP) with the latch downward, while install the SFP module to the lower Network port (SFP) with the latch upward. Insert the SFP module securely while the "Ejector knob" was fold in the SFP module.

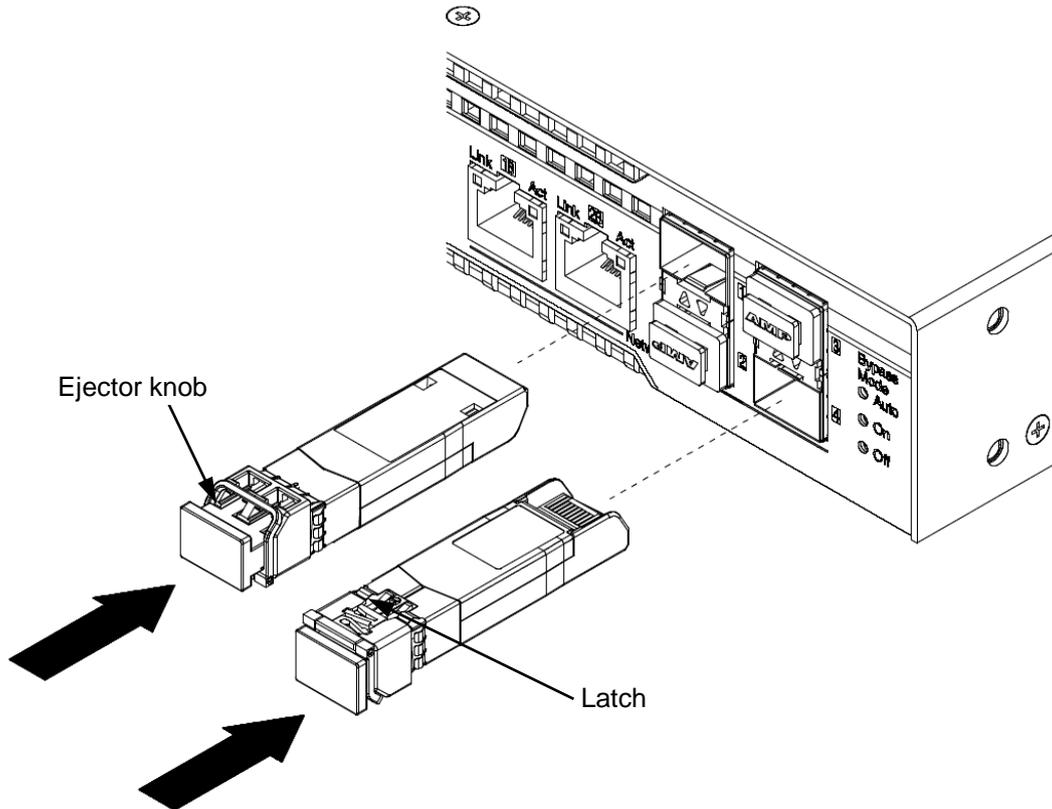


Figure. 2.6.2.1-2 Inserting SFP module



## CAUTION

Keep the SFP module ejector knob folded when inserting the SFP module. If the SFP module is inserted while the ejector knob not folded, the module may not be inserted securely.

### 2.6.2.2 Removing SFP module

<Procedure>

- (1) Tilt the SFP module ejector knob forward, and pinch the ejector knob to pull out the SFP module.

At this time, pull out the knob straight toward the SFP module. If it is pulled out at an angle, the SFP module lock will not be removed and SFP module may be damaged.

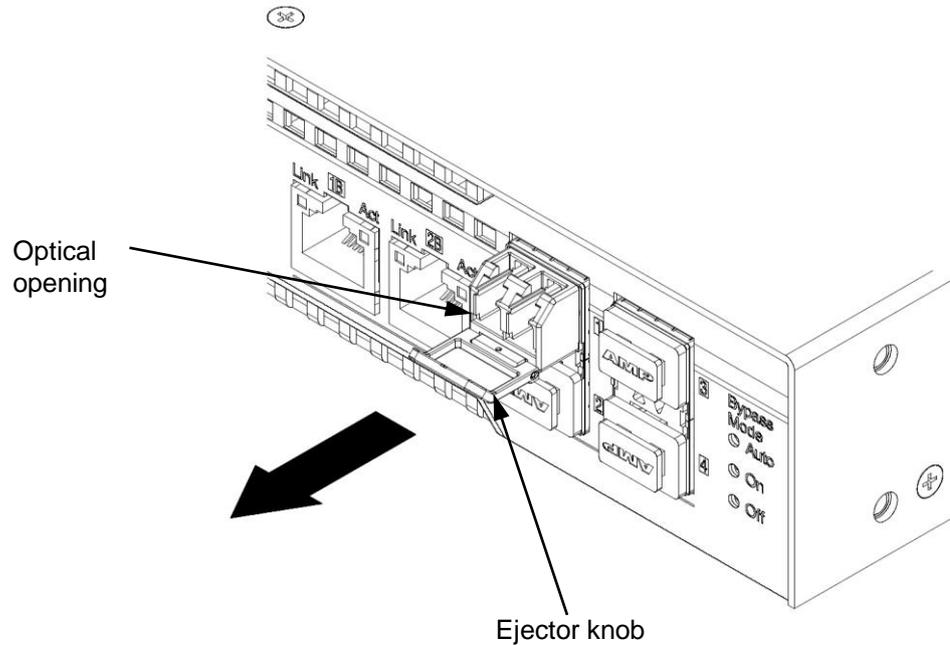


Figure 2.6.2.2-1 Removing SFP module

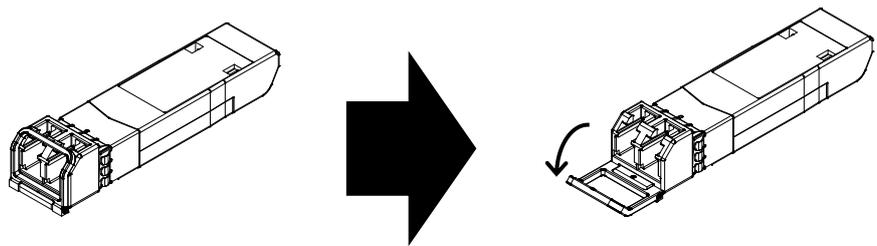


Figure 2.6.2.2-2 Operation of SFP module ejector knob forward

 **CAUTION**

---

1. Do not look into the SFP module optical opening. Laser light may enter your eyes, causing eye injury. When inserting and removing the SFP module, laser light may be emitted from the optical opening.
  2. Do not insert and remove the SFP module with the optical fiber cable connected. Insertion and removal with the optical fiber cable connected may damage the SFP module and optical fiber cable.
  3. When an optical fiber cable is not connected to the SFP module, attach the dust-proof plug to the SFP module. Dust might enter the SFP module. This may cause failure.
  4. Do not touch the electrical connector of the SFP module. Touching the connector may cause failure.
-

## 2.7 Connecting and removing the optical fiber cable

### 2.7.1 Connecting the optical fiber cable

<Procedure>

- (1) Remove the dust-proof plug of the SFP module to be connected to the optical fiber cable.

**Note:**

Keep dust-proof plug for future use.

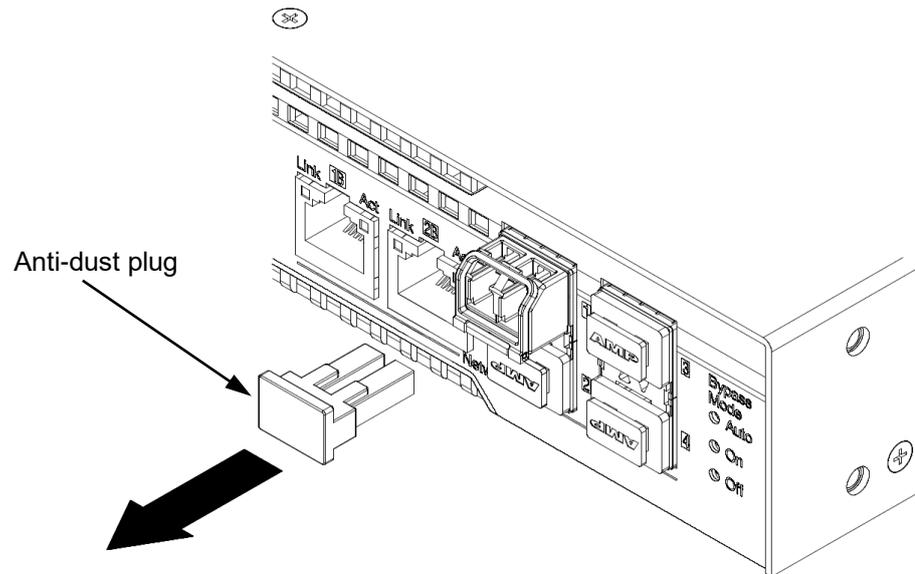


Figure 2.7.1-1 Removing the dust-proof plug



## CAUTION

When the optical fiber cable is not connected to the SFP module, attach the dust-proof plug to the SFP module. Dust might enter the SFP module. This may cause failure.

- (2) Remove the ferrule dust caps of the optical fiber cable LC connector.

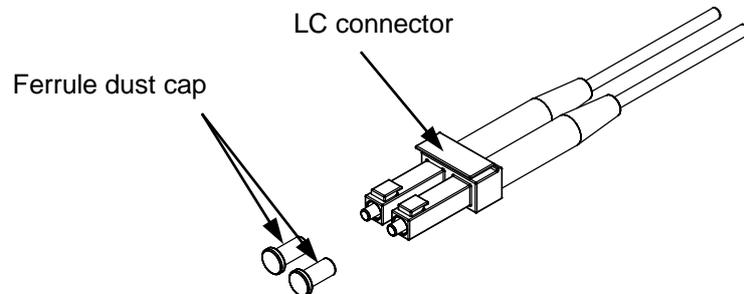


Figure 2.7.1-2 Removing the ferrule dust cap

- (3) Connect the optical fiber cable into the SFP module. Push it until engage the latch.

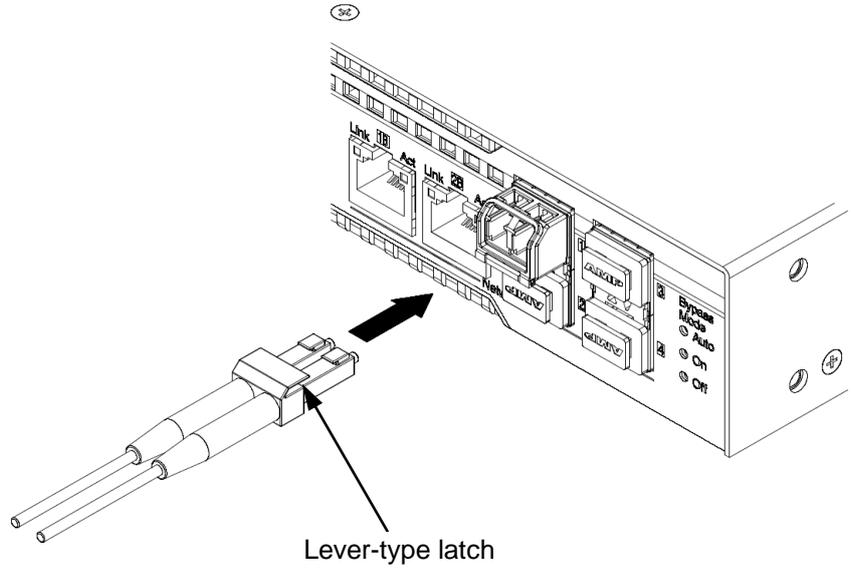


Figure 2.7.1-3 Connect the optical fiber cable

## 2.7.2 Removing the optical fiber cable

<Procedure>

- (1) Push the lever-type latch of the optical fiber cable with your fingers to gently remove the cable.

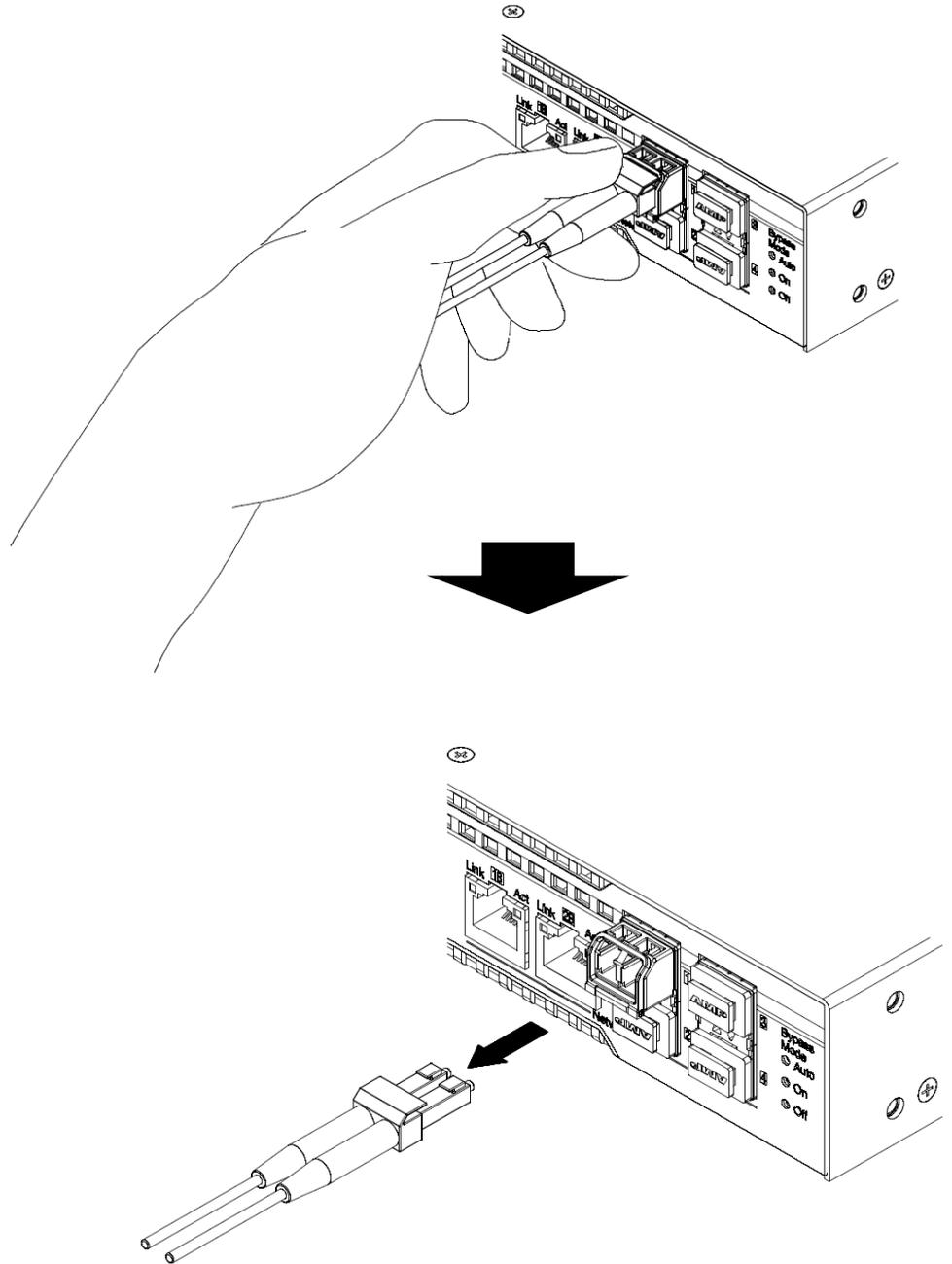


Figure 2.7.2-1 Removing the optical fiber cable

- (2) Attach the dust-proof plug of the SFP module.

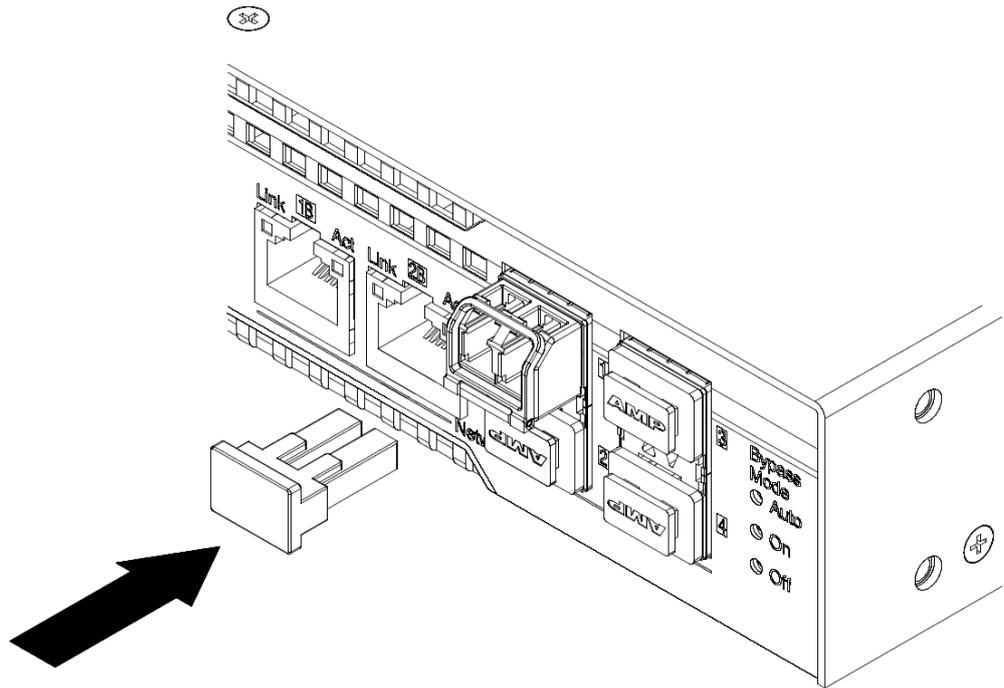


Figure 2.7.2-2 Attaching the dust-proof plug



## CAUTION

When the optical fiber cable is not connected to the SFP module, attach the dust-proof plug to the SFP module. Dust might enter the SFP module. This may cause failure.

## 2.8 Connecting and removing the UTP cable

### 2.8.1 Connect the UTP cable

Insert the UTP cable into the Ethernet port for management.  
Push in the cable until it latches.

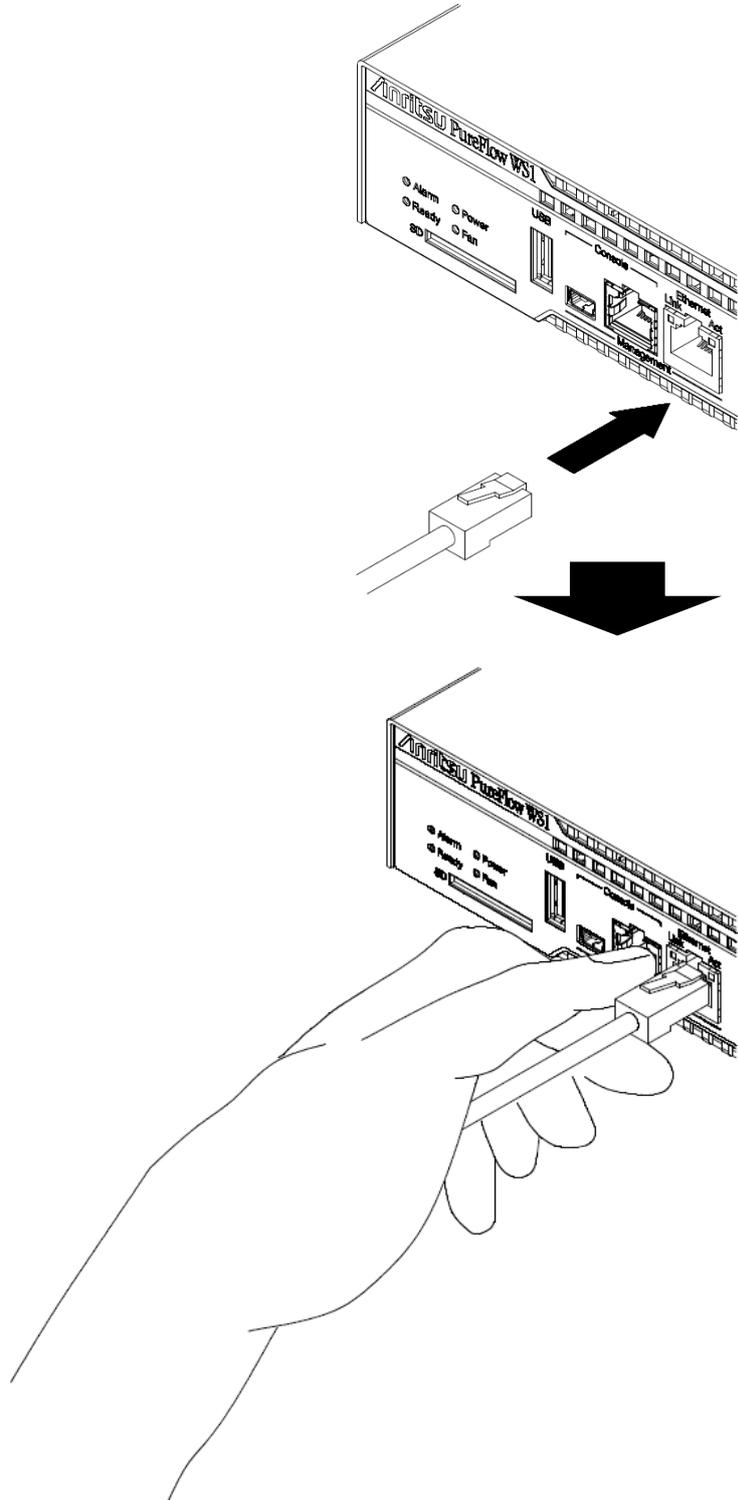


Figure 2.8.1-1 Inserting the UTP cable

### 2.8.2 Removing the UTP cable

Push the latch of the UTP cable with your fingers to disengage the latch, and gently remove the cable.

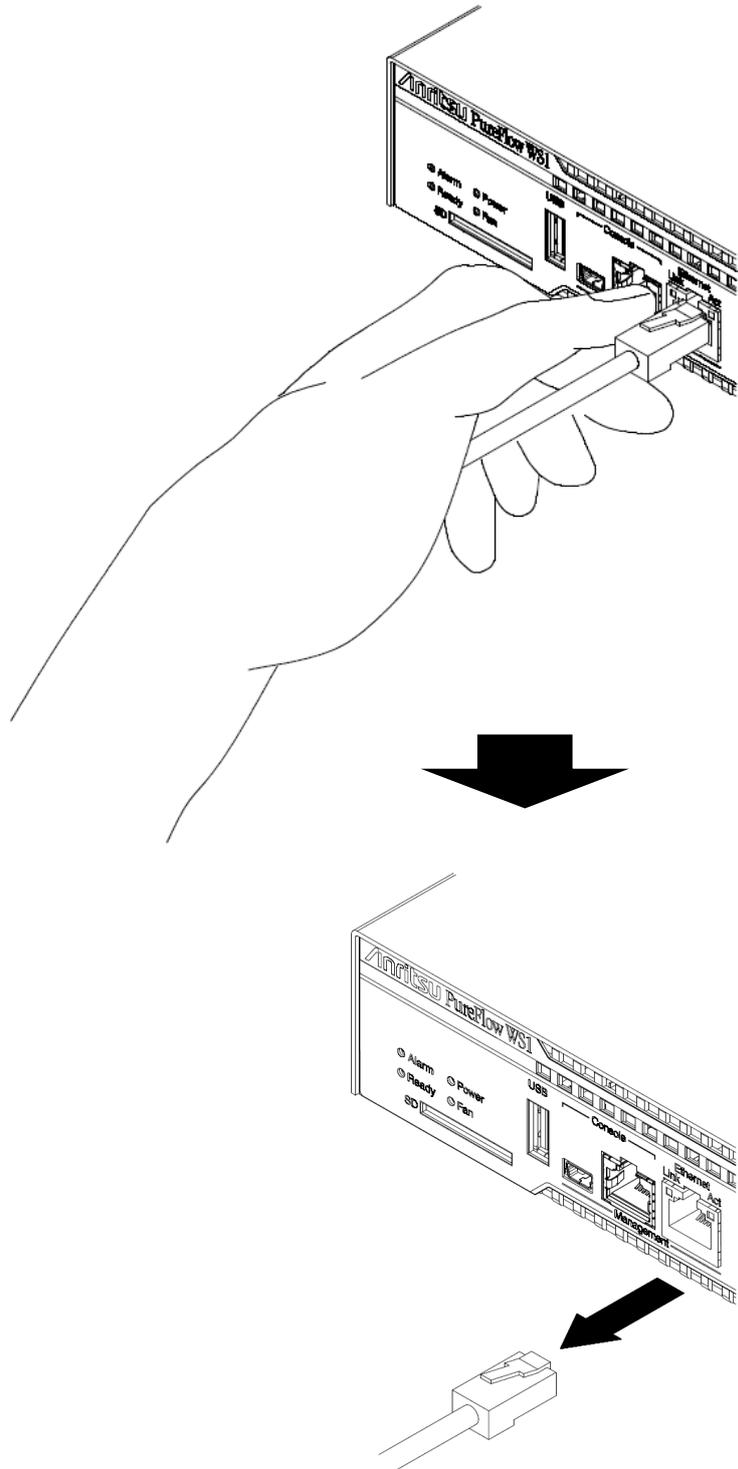


Figure 2.8.2-1 Removing the UTP cable

## 2.9 Inserting and removing the SD card

The SD card is used for downloading or uploading the configuration settings and software. For details, read the "Command Reference (NF7500-W012E)" and "Configuration Guide (NF7500-W013E)".

For the SD card, use our optional items. Use of an incorrect SD card may cause failure. Format the SD card in FAT16 or FAT32 format.

<Procedure for inserting the SD card>

- (1) The SD cap is inserted into the SD card slot of this device. Push the SD cap until a click sound is heard. If you release your hand, the SD cap pops out. Pinch the SD cap that popped out with your fingers to remove it.

Store the removed SD cap, and then insert it into the SD card slot again after using.

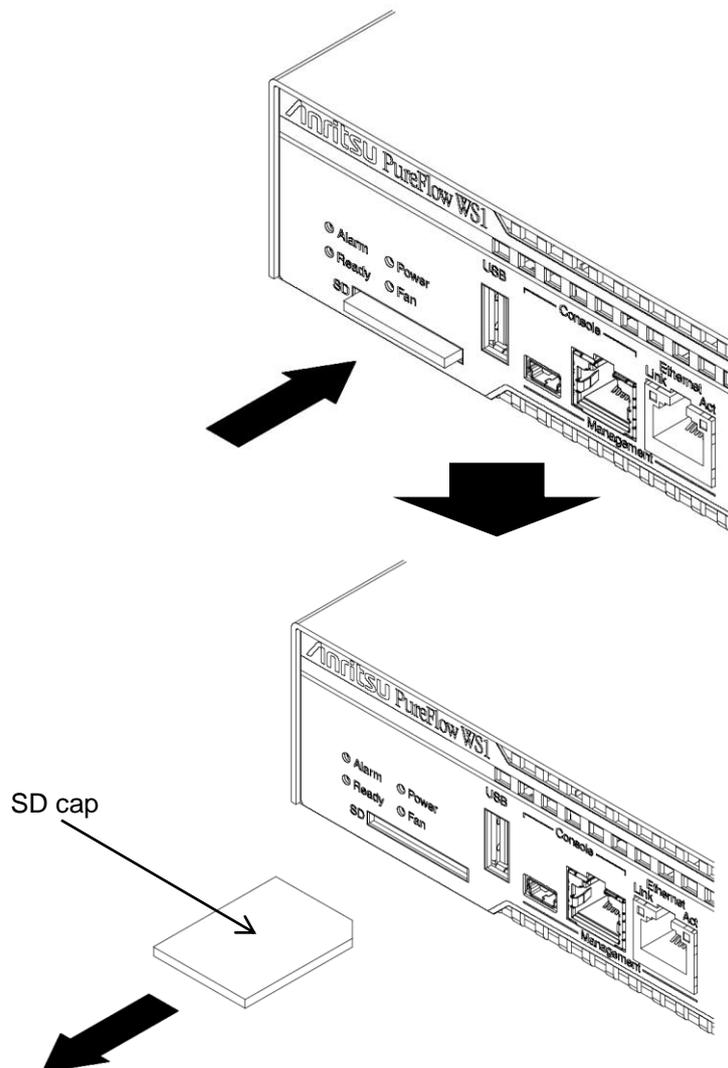


Figure 2.9-1 Removing the SD cap

- (2) Insert the SD card while paying attention to the direction until a click sound is heard.

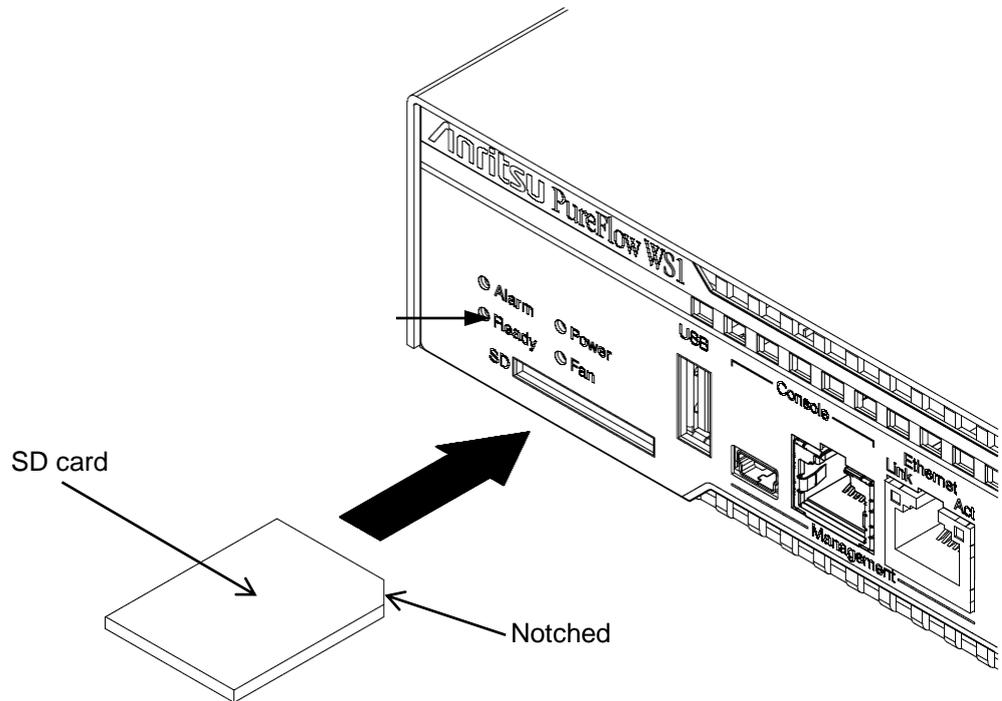


Figure 2.9-2 Inserting the SD card

<Procedure for removing the SD card>

- (1) Push the SD cap until a click sound is heard. If you release your hand, the SD cap pops out. Pinch the SD cap that popped out with your fingers to remove it.

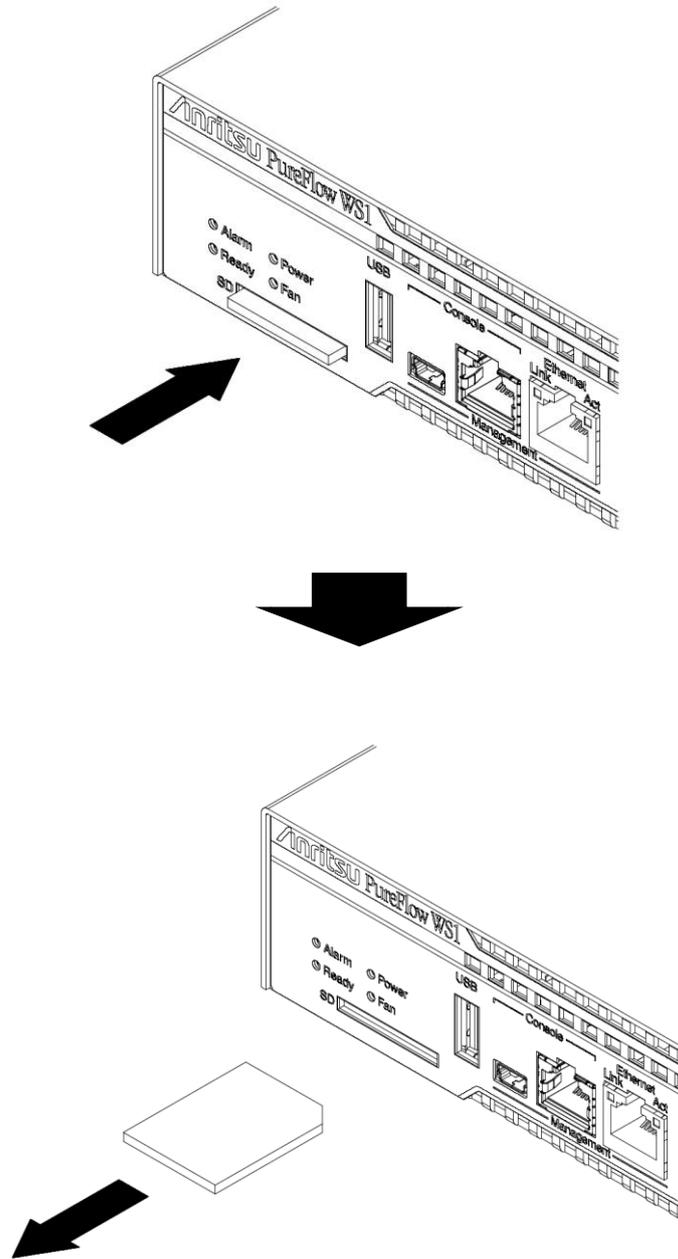


Figure 2.9-3 Removing the SD card

- (2) Push the SD cap until a click sound is heard.

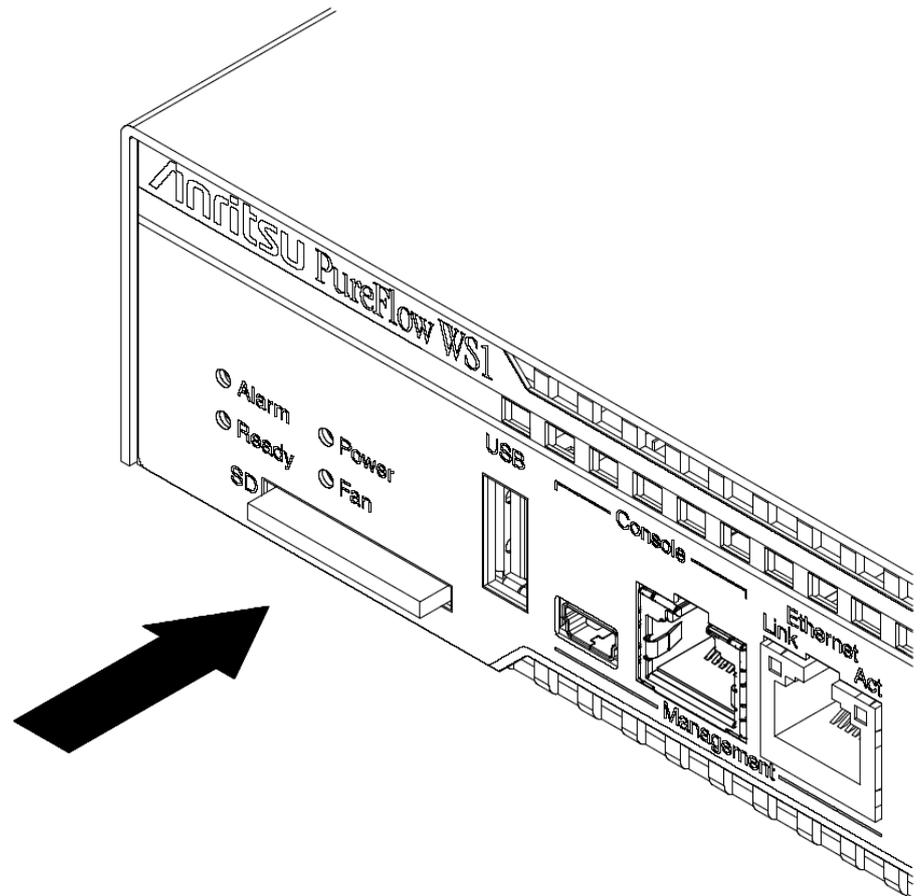


Figure 2.9-4 Attaching the SD cap

## 2.10 Connecting and removing the USB memory

The USB memory is used for downloading or uploading the configuration settings and software. For details, read the "Command Reference (NF7500-W012E)" and "Configuration Guide (NF7500-W013E)".

For the USB memory, use our optional items. Use of incorrect USB memory may cause failure. Format the USB memory in FAT16 or FAT32 format.

<Procedure for connecting the USB memory>

- (1) Remove the USB cap.

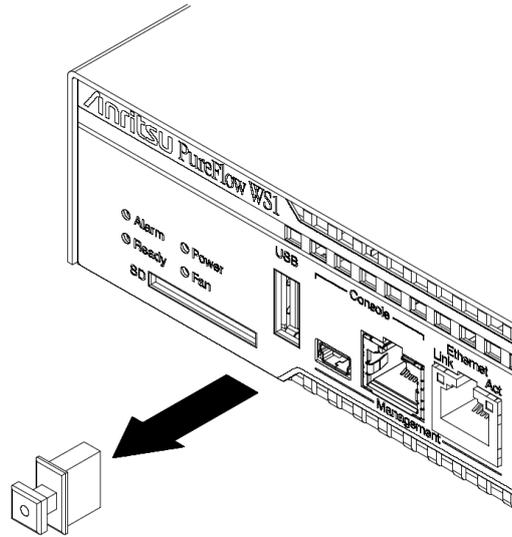


Figure 2.10-1 Removing the USB cap

- (2) Paying attention to the connector direction, insert the USB memory right to the back.

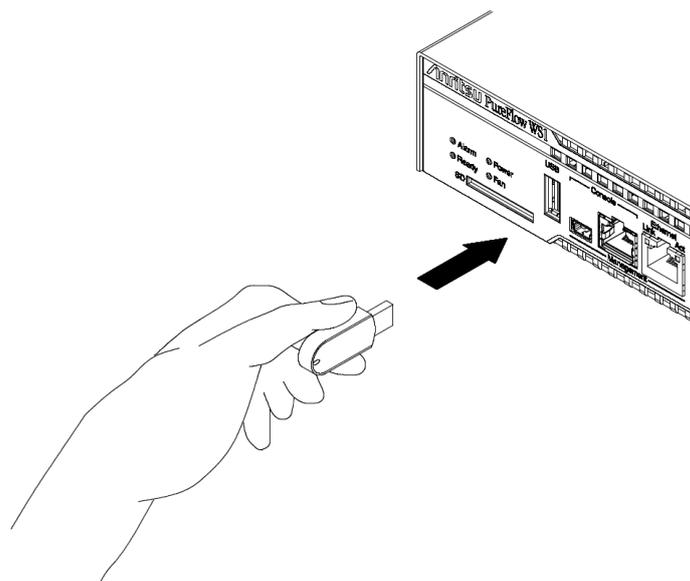


Figure 2.10-2 Connecting the USB memory

<Procedure for removing the USB memory>

- (1) Pinch the USB memory and gently remove it.

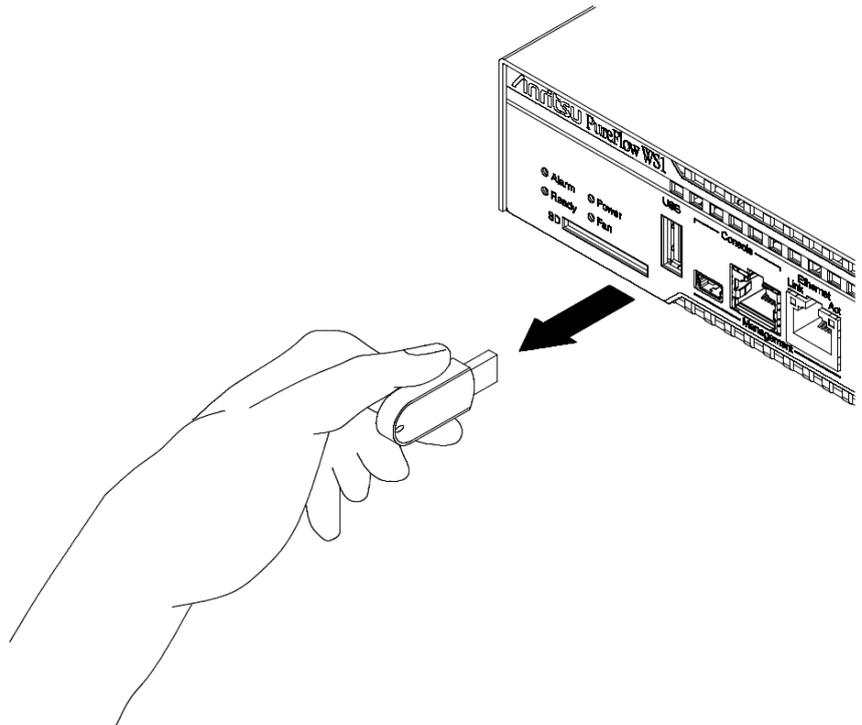


Figure 2.10-3 Removing the USB memory

- (2) Attach the USB cap.

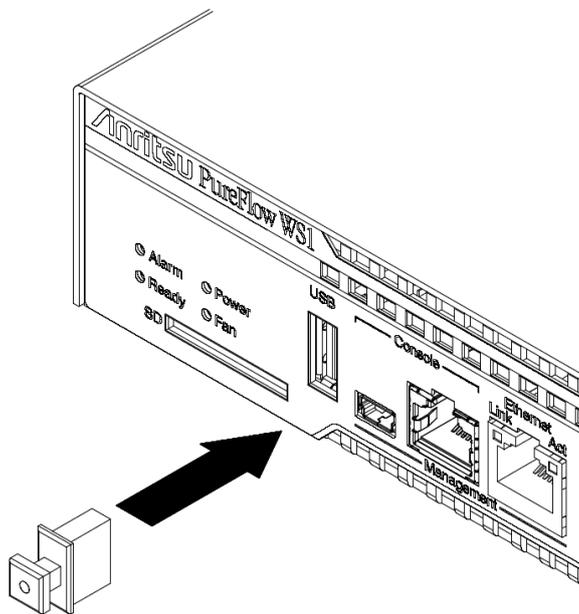


Figure 2.10-4 Attaching the USB cap

## 2.11 Daily inspection

- (1) Check the Alarm LED for device errors.  
If the Alarm LED lights up in red, refer to chapter 4 "Troubleshooting".
- (2) Clean dust from around this device.  
Regularly clean dust accumulated on the power plug.

---

 **WARNING**

---

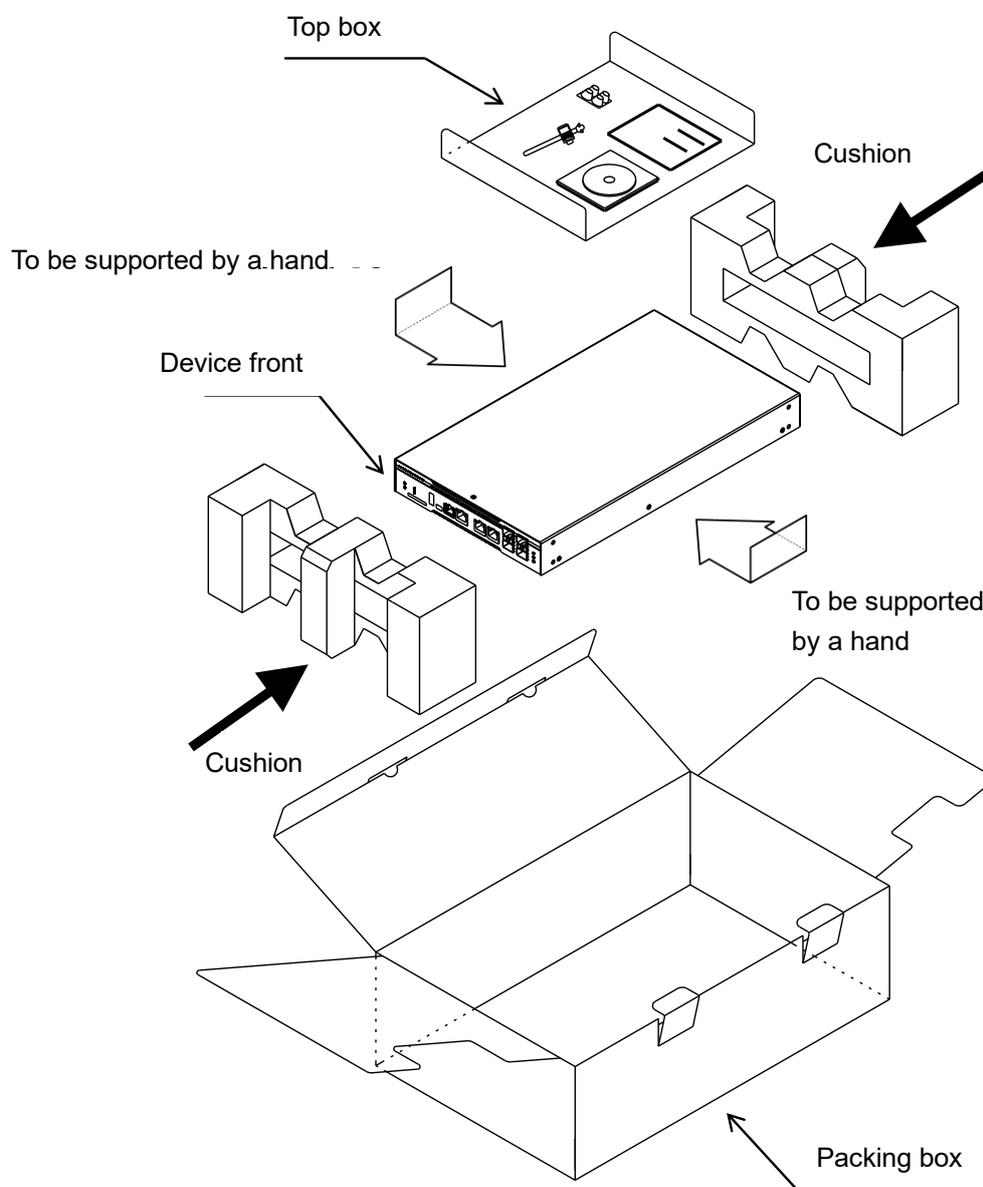
- **Dust accumulated on the power plug may cause a fire.**
  - **Do not block the air intake port and exhaust port. Blocking the air holes will increase the internal temperature of the device, possibly causing a failure.**
- 

- (3) This device has the built-in mechanical relay. This function works only in the case of an abnormality. Therefore, it is recommended to turn on or off the network bypass function nearly once per year and check how the bypass function works.  
By the command or turning the power off, the bypass function operation can be checked. For the procedures for shifting to the bypass status, refer to the Configuration Guide: TCP Acceleration Edition (NF7500-W013E).

## 2.12 Packing

### 2.12.1 How to pack this device

Place it in the packing materials used for delivery.



**Figure 2.12.1-1 How to pack this device**

- (1) Place the cushions at the front and rear of this device.
- (2) Support this device by holding both the side surfaces and the bottom, and place this device into the packing box.
- (3) Set the top box into the packing box.
- (4) Close the packing box.



## **CAUTION**

---

1. Do not pack this device with the SFP module or cable connected. Otherwise, the SFP module, cable and this device may cause failure.
  2. Insert the SFP cage plug in the Network port. If not dust might enter the SFP cage connector. This may cause failure.
-

### 2.12.2 Re-transportation

For re-transport of this device, contain the packing material in the packing box.

Keep the packing materials such as the packing box for future re-transportation.



#### **CAUTION**

---

Re-transporting the device without using the packing materials used for delivery may cause failure.

---

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# Chapter 3 *Startup and Shutdown*

---

This chapter describes how to start up and set the power supply of this device.

3.1	Supplying power .....	3-2
3.2	Settings .....	3-6
	3.2.1 Connecting the console (RJ-45) .....	3-7
	3.2.2 Setting the Network port.....	3-9
3.3	Turn off the AC power .....	3-10

## 3.1 Supplying power

- (1) Checking the power supply and power cord

Check the rating of the power supply for this device and of the AC power cord to be used. Be sure to observe the rating of this device and AC power cord for use.

For the rating of the power supply for this device and of the AC power cord, refer to "Appendix B.3 Power".

---

### **WARNING**

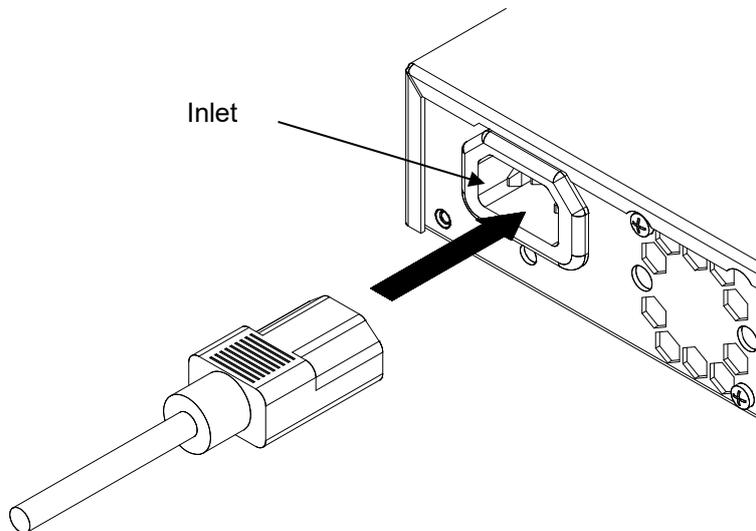
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**Be sure to use the dedicated AC power cord within the rating when installing this device. Supply of power that exceeds the rating may result in insulation breakdown or heat generation, leading to fire.**

---

- (2) Connecting the AC power cord

Insert the AC power cord into the AC inlet at the rear of this device.



**Figure 3.1-1 Connecting the AC power cord (inlet)**

## (3) Turning on the power

When the AC power cord is plugged into the power outlet, power is supplied to this device. Figure 3.1-2 shows an example of using the AC power cord (NY01004A).

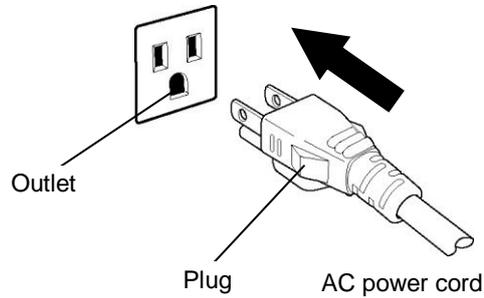


Figure 3.1-2 Connecting the AC power cord (outlet)

 **WARNING**

The power of this device is turned off when the AC power cord is disconnected.

Pay attention to the installation location of this device and to the AC power cord layout so that the power cable can be disconnected from the power outlet easily.

Difficulty in turning the power off may result in leading to fire, or death.

(4) Install the AC Power Cord Clamp

The supplied AC Power Cord Clamp (hereafter referred to as “Cord Clamp”) prevents the AC power cord disconnected by accident. Push the protrusion of the AC power cord clamp into the circular hole at the bottom of the AC inlet of this device, and secure the AC power cord clamp to this device.

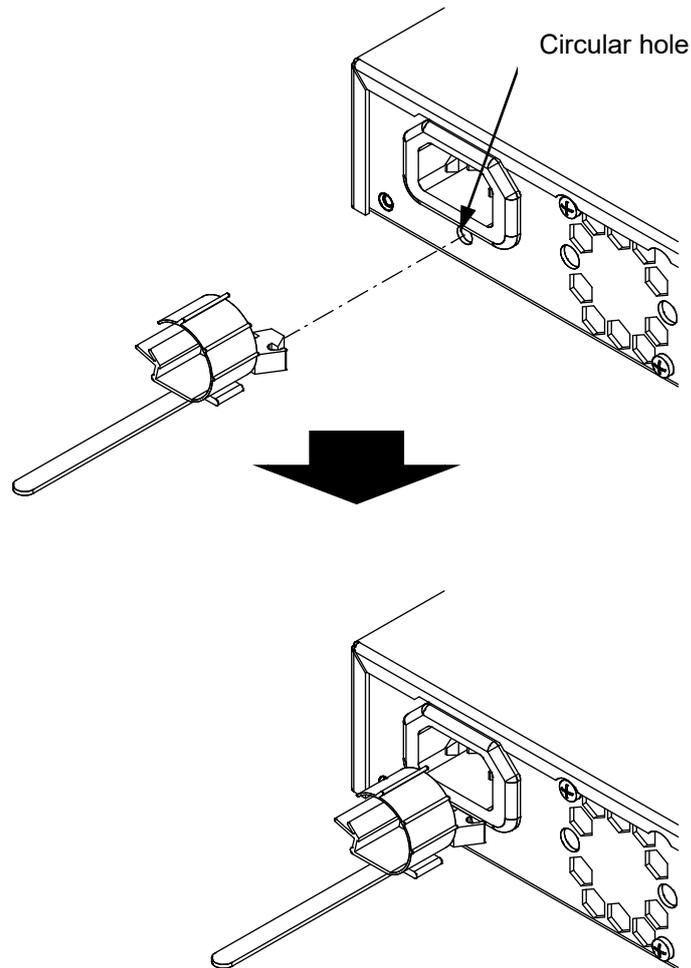


Figure 3.1-3 Clamping the AC power cord

---

 **WARNING**

The power of this device is turned off when the AC power cord is disconnected.

Install a circuit breaker or switch that can turn the power off when using the AC Power Cord Clamp. Difficulty in turning the power off may result in leading to fire, or death.

---

## (5) Clamping the AC power cord

The AC power cord can be clamped by using the Cord Clamp that was installed as described in step (3).

To clamp the cable, install the clamp head on the base of the AC power cord connector. Install the AC power cord connector on the power supply inlet while sliding the clamp head on the slide portion.

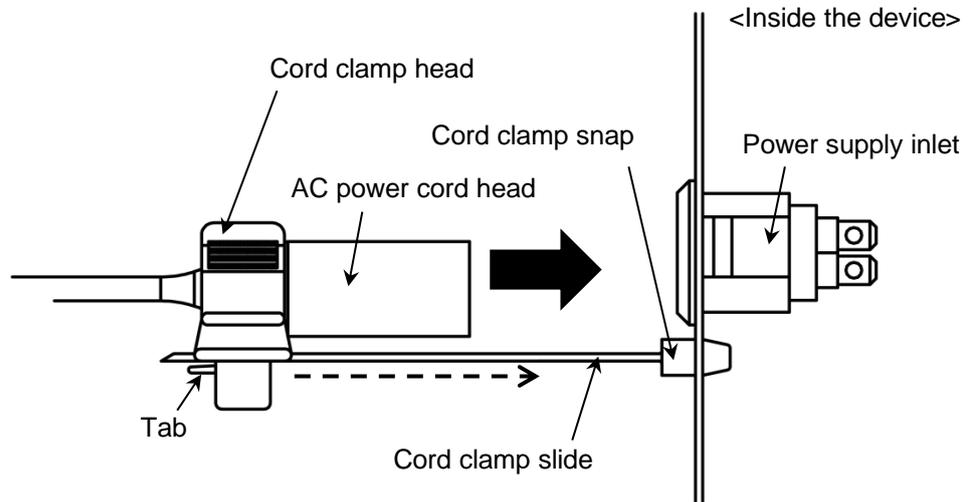


Figure 3.1-4 AC power cord clamp

## 3.2 Settings

This device has three management ports: the console ports (RJ-45 serial port and miniUSB serial port) and the Ethernet port (10/100/1000BASE-T) for remote access.

The setting of the device can be performed from each interface of this device according to the following procedure.

(1) Console port (RJ-45)

Use the optional console cable NY06004A (RJ-45/DB-9 adapter cable) for connecting to the terminals. Refer to chapter 3.2.1 for the terminal settings.

The same command as that for the Telnet connected with the Ethernet port or console port (miniUSB) can be executed.

For details of the command, refer to "Command Reference (NF7500-W012E)".

(2) Console port (miniUSB)

Use a commercially available miniUSB cable for connection with the terminals.

The same command as that for the Telnet connected with the Ethernet port or console port (RJ-45) can be executed.

For details of the command, refer to "Command Reference (NF7500-W012E)".

(3) Ethernet port, Network port

The network for controlling or the network for controlling the traffic enables you to set or check the device through Telnet or Web browser. For Telnet connection, the same command as the console port (RJ-45) and console port (miniUSB) can be executed.

For details of the command, refer to "Command Reference (NF7500-W012E)".

For details of login via the Web browser, refer to the "WebGUI Operation Manual (NF7500-W014E)".

### 3.2.1 Connecting the console (RJ-45)

You can connect a console to this device to display and set the operation parameters of this device. To connect the console to the console port, use the optional console cable NY06004A (RJ-45/DB-9 adapter cable). When using a PC as the console, it must support VT100 terminal emulation.

The console must satisfy the following communication conditions:

Communication method	: Asynchronous
Communication speed	: 9,600 bit/s (factory default setting)
Character length	: 8 bits
Parity	: None
Stop length	: 1 bit
Flow control	: None

The communication speed can be changed by the command set console baudrate. Specify the communication speed of the terminal emulation software according to the set communication speed.

For details, refer to the "Command Reference (NF7500-W012E)".



## CAUTION

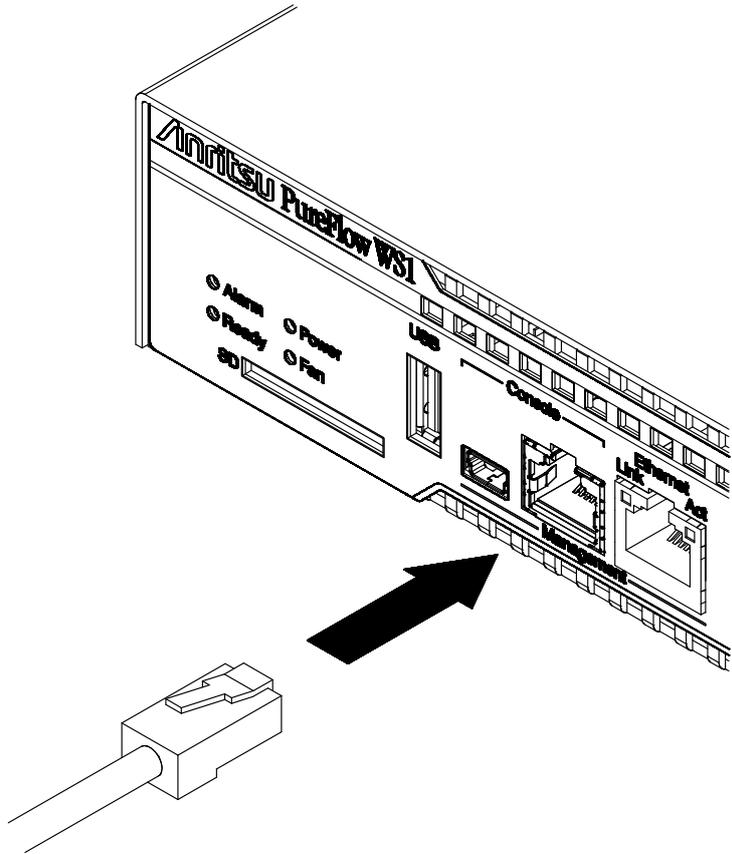
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**The connector type of the console port and Ethernet port is the same. Be careful not to connect a network cable to the console port (RJ45) by mistake. Incorrect connection may cause failure.**

---

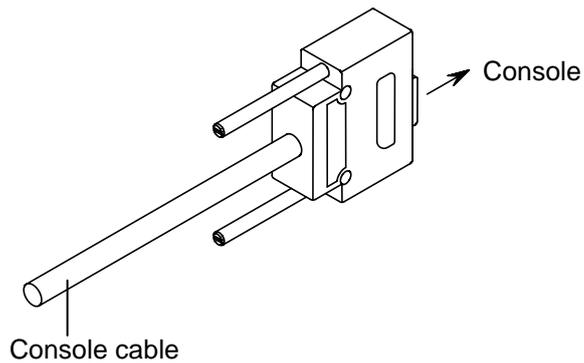
<Procedure>

- (1) Connect the RJ-45 side of the console cable to the console port.



**Figure 3.2.1-1 Connecting the console cable (device side)**

- (2) Connect the D-sub9 side of the console cable to the console.



**Figure 3.2.1-2 Connecting the console cable (console side)**

- (3) Use the console to start the terminal emulation program.

For details about starting up and setting this device and related commands, read “Command Reference (NF7500-W012E)” and “Configuration Guide (NF7500-W013E)”.

### 3.2.2 Setting the Network port

In NF7501A, 1/1 (1B) or 1/2 (2B) of the Network port (RJ-45) and 1/1 or 1/2 of the Network port (SFP) can be selected respectively for use. Settings for the Network port (RJ-45) are enabled at shipment. To use the Network port (SFP), select it according to the following procedure:

- (1) Execute the following command from the console port (RJ-45) or console port (miniUSB). The ports are switched after executing the command. Rebooting the device is not required.

```
PureFlow (A)> set port media-type 1/1 sfp
PureFlow (A)> set port media-type 1/2 sfp
PureFlow (A)> set bypass off
```

- (2) After selecting the port, save the settings by the following command. The setting described in (1) is not required at the next startup.

```
PureFlow (A)> save config
PureFlow (A)>
```

### 3.3 Turn off the AC power

Disconnect the AC power cords from the power outlet for all power supply units to turn off the power supply of this device completely. Figure 3.3-1 shows an example of using the AC power cord (NY01004A).

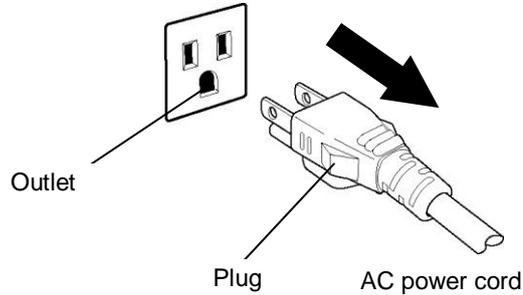


Figure 3.3-1 Turn off the AC power (outlet)

To remove an AC power cord clamped by the AC Power Cord Clamp on the inlet side, disconnect the cable while pulling down the cord clamp head tab.

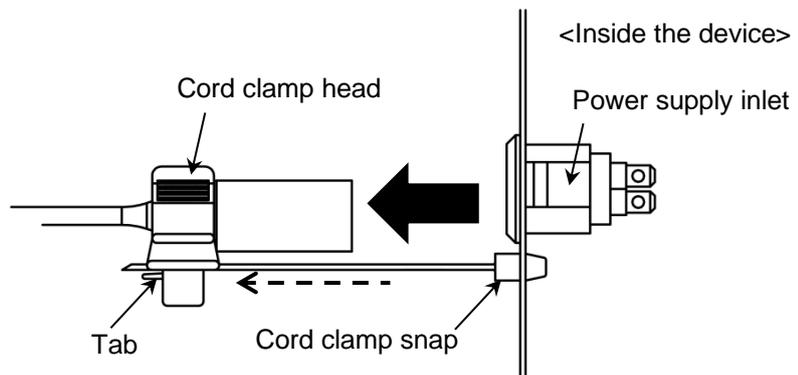


Figure 3.3-2 Unclamping the AC power cord

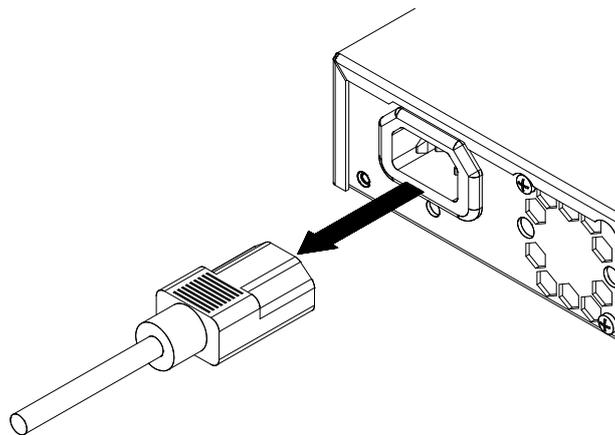


Figure 3.3-3 Disconnected the AC power (inlet)

**Note:**

After disconnecting the AC power cord, the AC power cord clamp can be removed from this device. When removing the clamp, hold the snap part to release the latch, and pull out the cord clamp from the unit.

---

 **DANGER**

---

Install this device in a location where the operator can easily access the power outlet. The power of this device is turned off when the AC power cord is disconnected from the power outlet.

If using the AC Power Cord Clamp, the AC power cord cannot be removed from the AC inlet immediately. Install a circuit breaker or switch that can turn off the power.

Difficulty in turning off the power may result in leading to fire, or death.

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# Chapter 4 Troubleshooting

---

This chapter describes the procedure for troubleshooting this device.

4.1	LED indicator confirmation .....	4-2
4.2	Troubleshooting errors .....	4-3
	4.2.1 Fan LED is blinking .....	4-3
	4.2.2 Other errors .....	4-4
4.3	Order the repair .....	4-5

## 4.1 LED indicator confirmation

This device uses LED indicators to indicate the operating status. LEDs on the front panel show the status of this device.

The following shows how to confirm the error from LED indications and troubleshoot the error.

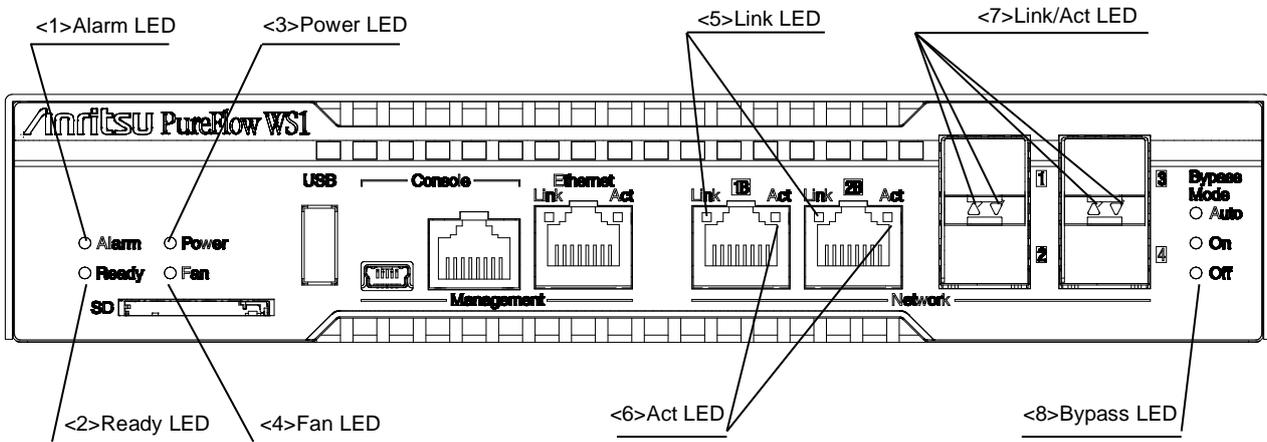


Figure 4.1-1 Names of LEDs

Table 4.1-1 LED indication (when further troubleshooting is required)

● = Lit      ○ = OFF      ▲ = Blinking      – = Indefinite

No	LED indication							Assumed error
	<1> Alarm (Red)	<2> Ready (Green)	<3> Power (Green)	<4> Fan (Green)	<8>Bypass			
					Auto	On	Off	
1	○	○	○	○	○	○	○	Power is not supplied correctly.
2	●	○	●	▲	—	—	—	Fan error
3	●	○	●	●	—	—	—	Other Errors
4	●	—	●	—	●	●	—	Error related to the traffic control*1

\*1: For errors related to the traffic control, refer to “Configuration Guide (NF7500-W013E)”.

## 4.2 Troubleshooting errors

### 4.2.1 Fan LED is blinking

<Troubleshooting flow when the Fan LED is blinking>

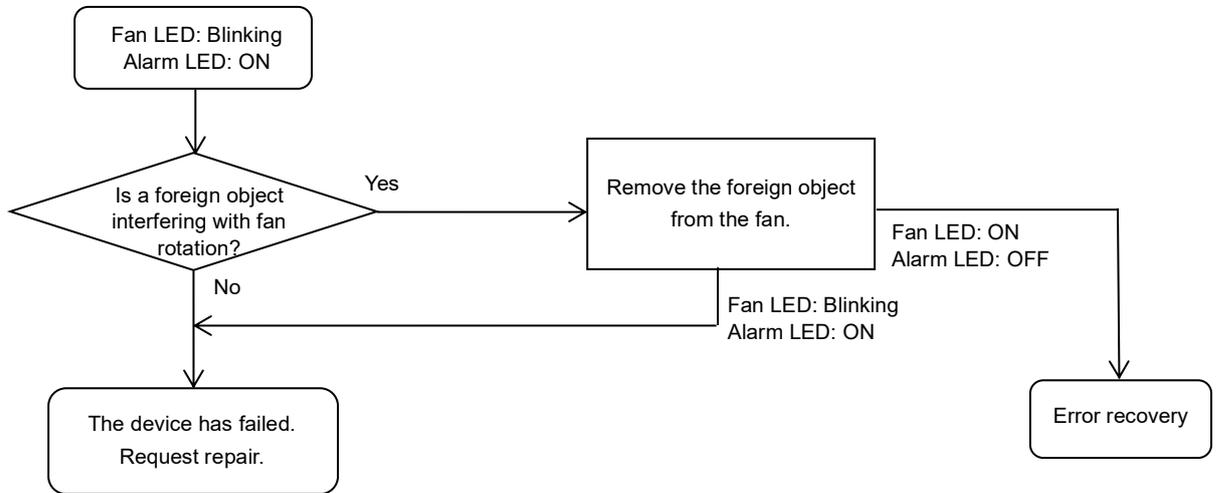


Figure 4.2.1-1 Error investigation flow when the Fan LED is blinking

### 4.2.2 Other errors

<Troubleshooting flow when another error occurs>

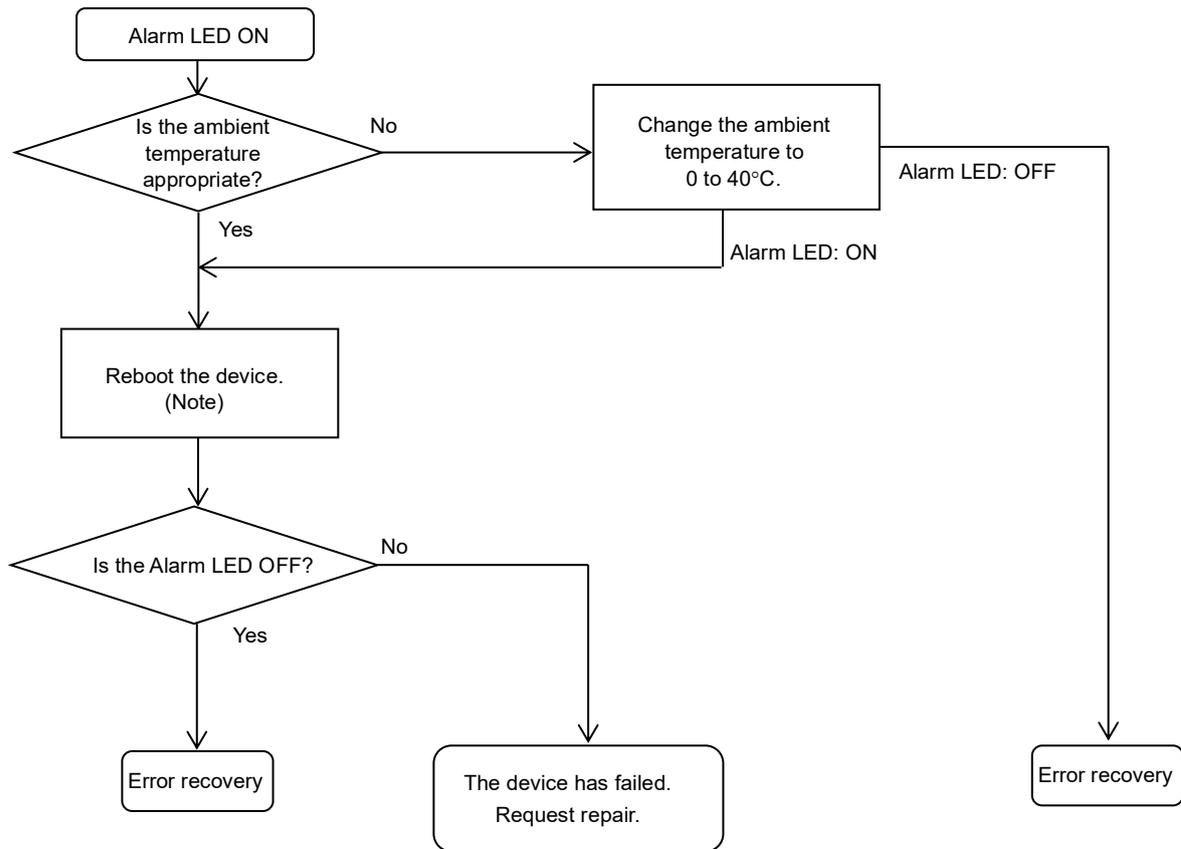


Figure 4.2.2-1 Error investigation flow when another error occurs

**Note:**

Error events that occur in this device can be recorded in multiple ways. The “log data” saved in the internal memory is lost when the power is turned off.

For details about how to displays the log data, read “Configuration Guide (NF7500-W013E)”.

## 4.3 Order the repair

Please order a repair if the device fails. Please send us the entire device set. So, please use the packing set. The device will be returned after repair. This device cannot be repaired by the customer. Contact your dealer if the device fails.

---

 **WARNING**

---

**Do not disassemble this device. There is a risk of receiving a severe or fatal electric shock.**

---

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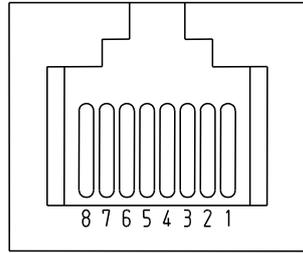
# *Appendix A I/O Interface Specifications*

---

A.1	Console port (RJ-45).....	A-2
A.2	Console port (miniUSB) .....	A-3
A.3	Ethernet port.....	A-4
A.4	Network port (RJ-45).....	A-5
A.5	USB port.....	A-7
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A.7	Network port (1000BASE-SX SFP).....	A-9
A.8	Network port (1000BASE-LX SFP).....	A-10
A.9	Network port (10/100/1000BASE-T SFP) .....	A-11

## A.1 Console port (RJ-45)

- (1) Connector: 8pin modular connector



\* Viewed from the mating face of the front console port

Figure A.1-1 Pin arrangement

- (2) Console cable (Dsub9 side)

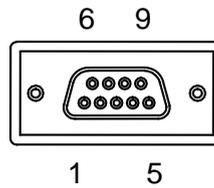


Figure A.1-2 Console cable

Table A.1-1 Pin assignment and console cable connection

RJ-45	Signal name	Connection	Dsub9 side
1	Reserved		8
2	Reserved		6
3	SD (sent data)		2
4	GND		5
5	GND		
6	RD (received data)		3
7	Reserved		4
8	Reserved		7

\* On the female side of Dsub9, the 1st and 9th pins cannot be used.

## A.2 Console port (miniUSB)

### (1) Connector

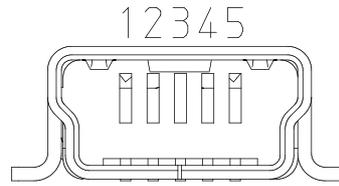


Figure A.2-1 miniUSB connector front view

Table A.2-1 Pin assignment

Pin No.	Signal name
1	+5V
2	D-
3	D+
4	NC
5	GND

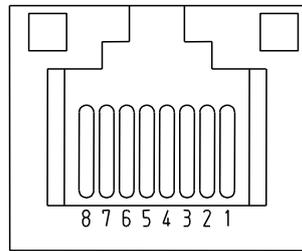
### (2) Specifications

Table A.2-2 Specification list

	Specifications	Explanation
1	Standard	USB 2.0
2	Connector type	MiniUSB Type B
3	Console baudrate	9600 bit/s (at shipment)

## A.3 Ethernet port

(1) Connector



\* Viewed from the mating face

Figure A.3-1 Pin arrangement

Table A.3-1 Pin assignment

Pin No.	Signal name	
	1000BASE-T	100BASE-TX 10BASE-T
1	TP1+	TX+/RX+
2	TP1-	TX-/RX-
3	TP0+	RX+/TX+
4	TP3+	—
5	TP3-	—
6	TP0-	RX-/TX-
7	TP2+	—
8	TP2-	—

(2) Network cable

Use a network cable and connector that satisfy the following specifications

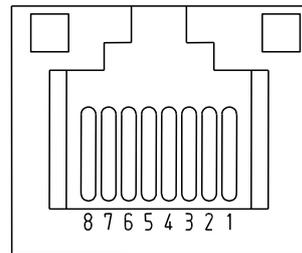
- Category: CAT5E or CAT6 recommended  
(Maximum cable length: 100 m)
- Connector: 8-pin modular connector

**Notes:**

1. If a Cat 5 network cable is used in 1000BASE-T traffic, the maximum cable length might be too short due to the cable quality, causing communication failure.
2. Enable auto negotiation for 1000 Mbit/s communication in 1000BASE-T traffic.
3. If the speed and duplex settings are fixed, use the same settings in the communicating device.

## A.4 Network port (RJ-45)

### (1) Connector



\* Viewed from the mating face

**Figure A.4-1 Pin arrangement**

**Table A.4-1 Pin assignment**

Pin No.	Signal name	
	1000BASE-T	100BASE-TX 10BASE-T
1	TP1+	TX+/RX+
2	TP1-	TX-/RX-
3	TP0+	RX+/TX+
4	TP3+	—
5	TP3-	—
6	TP0-	RX-/TX-
7	TP2+	—
8	TP2-	—

### (2) Network cable

Use a network cable and connector that satisfy the following specifications.

- Category: CAT5E or CAT6 recommended  
(Maximum cable length: 100 m)
- Connector: 8-pin modular connector

**Notes:**

1. In network bypass status, 1B and 2B of the Network port (RJ-45) are in bypass status. In the bypass status, this device works as the cross cable.
2. Considering loss inside the device and communication in bypass status, it is recommended to adjust the length of the network cable to be connected to 1B and 2B of the Network port (RJ-45) to 60 m or less in total.
3. If a Cat 5 network cable is used in 1000BASE-T traffic, the maximum cable length might be too short due to the cable quality, causing communication failure.
4. Enable auto negotiation for 1000 Mbit/s communication in 1000BASE-T traffic.
5. If the speed and duplex settings are fixed, use the same settings in the communicating device.

## A.5 USB port

### (1) Connector

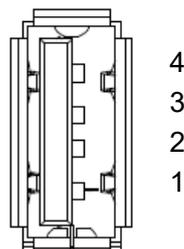


Figure A.5-1 Pin arrangement

Table A.5-1 Pin assignment

Pin No.	Signal name
1	+5V
2	D-
3	D+
4	GND

### (2) Functions

Table A.5-2 Function list

	Function	Contents
1	Specification	USB 2.0
2	Connector type	Standard A
3	Maximum data transfer rate	480 Mbit/s (High-Speed)
4	Maximum output current	0.5 A

## A.6 SD card slot

(1) Connector

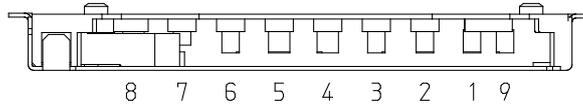


Figure A.6-1 SD connector front view

Table A.6-1 Pin assignment

Pin No.	Signal name	Article
1	DAT3	Data Line Bit3
2	CMD	Command/Response
3	VSS	Ground
4	VDD	Supply Voltage
5	CLK	Clock
6	VSS	Ground
7	DAT0	Data Line Bit0
8	DAT1	Data Line Bit1
9	DAT2	Data Line Bit2



SDHC logo is trademark of SD-3C, LLC.

## A.7 Network port (1000BASE-SX SFP)

- (1) Optical connector
  - LC connector (SFP module)

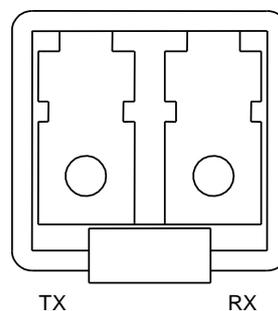


Figure A.7-1 1000BASE-SX module front view

**Notes:**

1. The figure above shows the connector view when installing 1000BASE-SX SFP module to the Network port.
2. Connect the transmitter (TX) of the device to the receiver (RX) of the other side, and the receiver (RX) of the device to the transmitter (TX) of the other side.

- (2) Network cable

Use a network cable and connector that satisfy the following specifications.

- Cable type:
  - 62.5  $\mu\text{m}$ /125  $\mu\text{m}$  (Core/Clad) Multimode optical fiber cable
  - 50  $\mu\text{m}$ /125  $\mu\text{m}$  (Core/Clad) Multimode optical fiber cable
- Cable standards: 850 nm wavelength
- Connector: LC connector
- Operating range: See below

Fiber type	Modal bandwidth @850 nm (MHz-km)	Range (m)	
		MIN.	MAX.
62.5 $\mu\text{m}$ MMF	160	2	220
62.5 $\mu\text{m}$ MMF	200	2	275
50 $\mu\text{m}$ MMF	400	2	500
50 $\mu\text{m}$ MMF	500	2	550

\* For details, see Chapter 38 in Section 3 of IEEE Std 802.3-2012.

## A.8 Network port (1000BASE-LX SFP)

- (1) Optical connector
  - LC connector (SFP module)

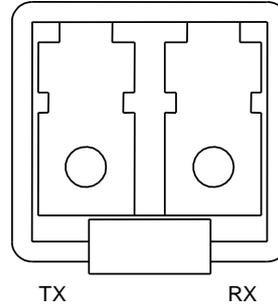


Figure A.8-1 1000BASE-LX module front view

**Notes:**

1. The figure above shows the connector view when installing 1000BASE-LX SFP module to the Network port.
2. Connect the transmitter (TX) of the device to the receiver (RX) of the other side, and the receiver (RX) of the device to the transmitter (TX) of the other side.

- (2) Network cable

Use a network cable and connector that satisfy the following specifications.

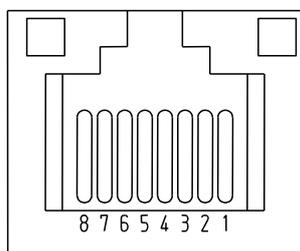
- Cable type
  - 62.5  $\mu\text{m}$ /125  $\mu\text{m}$  (Core/Clad) Multimode optical fiber cable
  - 50  $\mu\text{m}$ /125  $\mu\text{m}$  (Core/Clad) Multimode optical fiber cable
  - 10  $\mu\text{m}$ /125  $\mu\text{m}$  (Core/Clad) Single-mode optical fiber cable
- Cable standards: 1310 nm wavelength
- Connector: LC connector
- Operating range: See below

Fiber type	Modal bandwidth @1300 nm (MHz-km)	Range (m)	
		MIN.	MAX.
62.5 $\mu\text{m}$ MMF	500	2	550
50 $\mu\text{m}$ MMF	400	2	550
50 $\mu\text{m}$ MMF	500	2	550
10 $\mu\text{m}$ SMF	N/A	2	5000

\* For details, see Chapter 38 in Section 3 of IEEE Std 802.3-2012.

## A.9 Network port (10/100/1000BASE-T SFP)

### (1) Connector



\* Viewed from the mating face

**Figure A.9-1 Pin arrangement**

**Table A.9-1 Pin assignment**

Pin No.	Signal name	
	1000BASE-T	100BASE-TX 10BASE-T
1	TP1+	TX+/RX+
2	TP1-	TX-/RX-
3	TP0+	RX+/TX+
4	TP3+	—
5	TP3-	—
6	TP0-	RX-/TX-
7	TP2+	—
8	TP2-	—

### (2) Network cable

Use a network cable and connector that satisfy the following specifications

- Category: CAT5E or CAT6 recommended  
(Maximum cable length: 100 m)
- Connector: 8pin modular connector

#### Notes:

1. If a Cat 5 network cable is used in 1000BASE-T traffic, the maximum cable length might be too short due to the cable quality, causing communication failure.
2. Enable auto negotiation for 1000 Mbit/s communication in 1000BASE-T traffic.
3. If the speed and duplex settings are fixed, use the same settings in the communicating device.

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# *Appendix B Device Specifications*

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B.1	Functions .....	B-2
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B.3	Power .....	B-5
B.4	Environment .....	B-6
B.5	Interference regulations .....	B-7
B.6	Safety standards .....	B-8

## B.1 Functions

Table B.1-1 Function list

	Function		PureFlow WS1 (NF7501A)	
1	Controllable bandwidth <sup>Note1</sup>		1 kbit/s to 1 Gbit/s	
2	Scenario	Max. number of scenarios <sup>Note2</sup>	4,096	
		Max. number of scenario hierarchies	4	
		Scenario type	Acceleration mode <sup>Note3</sup> , aggregate mode, individual mode, discard mode	
3	Filter	Max. number of filters	10,000	
4	Rule list	Max. number of Groups	1,024	
		Max. number of Entries	512 (Group × Entry total: 10,000)	
5	Flow	Max. number of flows	512,000	
6	Interface	Network port	Select RJ-45 or SFP for the ports 1 and 2. Use SFP for ports 3 and 4. Available SFP 1000BASE-SX, 1000BASE-LX 10/100/1000BASE-T	
		Ethernet port	10/100/1000BASE-T × 1	
		Console port	RS-232C (RJ-45) × 1, miniUSB × 1	
		USB port	USB 2.0 × 1	
		SD card slot	SD × 1	
7	Traffic acceleration <sup>Note3</sup>	Max. number of TCP session	40,000	
		Target protocol	TCP (IPv4/IPv6)	
		Data compression	ZIP format	
		Network connection	In-Path, Out-Of-Path	
		FEC Function <sup>Note4</sup>	Max. number of TCP-FEC session	400
		Bypass	Bypass transfer (RTT measurement, TCP connection error, KeepAlive error, Force)	
		Redundancy	Secondary Peer transfer	
8	SMP protocol acceleration <sup>Note 3</sup>	Version	SMB2.0.2, SMB2.1	
		Max. number of SMB session	1,000	

	Function		PureFlow WS1 (NF7501A)
9	VLAN		VLAN Tag (IEEE802.1Q), QinQ (IEEE802.1ad)
10	Max. frame length	Network port	2,048 bytes (at shipment) or 10,240 bytes Switched by setting
		Ethernet port	1,518 bytes
11	Flow identification	Bridge-control filter	Destination MAC addresses (Fixed as 01-80-C2-00-00-XX)
		Ethernet filter	VLAN ID, CoS, 2-level VLAN ID, 2-level CoS, Ethernet Type/Length
		IPv4 filter/ IPv6 filter	VLAN ID, CoS, 2-level VLAN ID, 2-level CoS, destination IP address, transmission source IP address, ToS, protocol, destination TCP/UDP port, transmission source TCP/UDP port
12	System packet buffer		500 MByte
13	QoS setting		8 priority levels, maximum/minimum rate (1 kbit/s to 1 Gbit/s), buffer amount
14	Remarking function		Yes
15	Network management	System Interface (via Ethernet port/Network port)	Ping (IPv4/IPv6), Traceroute (IPv4/IPv6), Telnet (IPv4/IPv6), SSH (IPv4/IPv6), RADIUS (IPv4/IPv6), SNTP (IPv4/IPv6), SYSLOG (IPv4/IPv6), SNMP (IPv4 only), WebAPI (IPv4/IPv6), WebGUI (IPv4/IPv6), OpenFlow <sup>Note5</sup> (IPv4/IPv6), probe agent protocol (IPv4 only)
		Channel Interface (via Network port)	Ping (IPv4/IPv6), Traceroute (IPv4/IPv6)
16	Failure		Link-down transfer, auto reboot function
17	Network bypass function <sup>Note6</sup>		Yes
18	Top counter function		Yes

**Note 1:** If the required data transfer rate per port is more than 100 Mbit/s, please order a band expansion license.

**Note 2:** If you want to use 2,048 scenarios or more, please order a scenario expansion license.

**Note 3:** If you want to use the traffic acceleration function and SMB protocol acceleration function, please order a TCP acceleration function license.

**Note 4:** If you want to use the FEC function, please order a FEC function license.

**Note 5:** If you want to use the OpenFlow function, please order a OpenFlow function license.

**Note 6:** If you want to use the network bypass function, use ports 1B and 2B of the Network port (RJ-45).

## **B.2 Dimensions and weight**

- Dimensions: 42 (H), 212 (W), 375.5 (D) mm (excluding protrusions)
- Weight: 2.2 kg or less

## B.3 Power

- Voltage: AC 100 - 127 V,  
AC 200 - 240 V
- Current: 0.8 A (at 100 V)  
0.4 A (at 200 V)
- Current consumption: 85 VA or less, 65 W or less
- Frequency: 48 - 52 Hz  
58 - 62 Hz
- Power receiving system: Single-phase two-wire, 1 ground line
- Instantaneous interruption: 100%, 1 cycle
- Inrush current: 15 A typ. (at 100 V)  
30A typ. (at 200 V)
- Leakage current: 0.5 mA or less
- Quantity of heat: 65 W•sec, 234 kJ/hr, 56 kcal/hr

The values without special notes indicate the values for the entire equipment.

**Table B.3-1 AC power cord rating**

Model	Rated voltage	Rated current	Remarks
NY01001A	AC125 V	10 A	For the U.S.
NY01004A	AC125 V	7 A	For Japan

## **B.4 Environment**

- Operable temperature: 0 to 40°C
- Operable humidity: 20 to 80% (no condensation)
- Storage temperature: -20 to 60°C
- Operable height: 2,000 m or lower
- MTBF: 150,000 H
- Life limited parts:
  - Fan
    - 7.0 years at operable temperature 30°C
    - 6.0 years at operable temperature 40°C
  - AC power supply
    - 10.0 years at operable temperature 30°C
    - 5.0 years at operable temperature 40°C

## **B.5 Interference regulations**

- VCCI: Class A
- FCC: Class A
- EN55032: Class A
- Harmonic current: JIS C 61000-3-2

## **B.6 Safety standards**

- UL: 62368-1
- CSA: C22.2 No.62368-1-14
- EN: 60950-1

# *Appendix C Third Party Software License*

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C.1	Third Party Software .....	C-2
C.2	GPLv2 .....	C-3
C.3	GPLv3 .....	C-7
C.4	LGPLv2.1.....	C-16
C.5	iputils .....	C-23
C.6	ntpd .....	C-24
C.7	libuuid .....	C-25
C.8	sudo .....	C-26
C.9	openssh.....	C-28
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C.12	radiusclient-ng .....	C-36
C.13	apache.....	C-38
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C.15	jquery.....	C-42
C.16	jqplot.....	C-43

## C.1 Third Party Software

The following table lists the third-party libraries, applications, and other software used by this device.

**Table C.1-1 List of Libraries, Applications, and Licenses**

Item name	Contents	License
linux	Linux kernel	GPLv2
libgcc	Gcc library	GPLv2
libpthread	POSIX thread library	LGPL
glibc	GNU C standard library	LGPL
busybox	Command line application	GPLv2
net-tools	NET-3 network tool This tool is used to control the network subsystems (arp, ifconfig, route, etc.)	GPLv2
iputils	Tool used to test the network host reachability (ping)	Original
module-init-tools	Driver module installation tool	GPLv2
traceroute	Tool used to acquire the pass information (traceroute)	GPLv2
ntpd	NTP client	Original
rsyslog	Syslog daemon	GPLv3
libee	String operation library	GPLv2
libestr	String operation library	GPLv2
libuuid	Identifier generation library	Original
sudo	Program that assigns restricted super-user privileges to designated users	ISC-style
udev	Device manager that provides a persistent device naming system	GPLv2
iptables	Packet filtering application	GPLv2
openssh	SSH server	Original
openssl	Cryptographic library	Original
zlib	Data compression library	Original
radiusclient-ng	RADIUS client	Original
apache	HTTP server	Original
json-c	JSON data analysis package	Original
u-boot	Boot loader	GPLv2
jquery	JavaScript library	Original
jqplot	jQuery plug-in for graph drawing	Original
openvswitch	OpenFlow protocol processing	apache

The terms of these licenses are described on the following pages.

## C.2 GPLv2

### GNU GENERAL PUBLIC LICENSE Version 2, June 1991

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## **C.6 ntpd**

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jloup@gzip.org                      madler@alumni.caltech.edu

## C.9 openssh

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[Tatu continues]

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- DES is now external, in the OpenSSL library
- GMP is no longer used, and instead we call BN code from OpenSSL
- Zlib is now external, in a library
- The make-ssh-known-hosts script is no longer included
- TSS has been removed
- MD5 is now external, in the OpenSSL library
- RC4 support has been replaced with ARC4 support from OpenSSL
- Blowfish is now external, in the OpenSSL library

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@version 3.0 (December 2000)

Optimised ANSI C code for the Rijndael cipher (now AES)

@author Vincent Rijmen <vincent.rijmen@esat.kuleuven.ac.be>  
@author Antoon Bosselaers <antoon.bosselaers@esat.kuleuven.ac.be>  
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## C.10 openssl

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## C.11 **zlib**

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## C.12 radiusclient-ng

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## C.16jqplot

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