LG-NØRTEL

TurboLIGHT16
Hardened ONT Unit

(NS 16 1G NN-O)

Please read this manual carefully before operating your set.

Retain it for future reference.

C O N T E N T S

NS 16 1G NN-O

Product and personnel safety guidelines

This section contains safety guidelines that you must follow for personal safety and

to operate the equipment correctly.

LG-Nortel documentation contains precautionary messages and safety procedures

that refer to specific tasks or conditions. You must read and follow all precautionary

messages before you start to work on the equipment.

Audience

Personnel working directly on equipment must be

• trained, authorized, and qualified to carry out the tasks required

• able to follow safety guidelines specific to the product and all local customerspecific

safety procedures

Precautionary messages

To prevent personal injury, equipment damage, and service interruptions, you must

follow all precautionary messages in Nortel documentation and all local safety

standards required by your service provider.

The following precautionary messages appear in Nortel documentation:

DANGER
Risk of personal injury
A precautionary message with this symbol indicates a risk of
personal injury.

DANGER
Risk of electrical shock
A precautionary message with this symbol indicates a risk of
personal injury caused by an electrical hazard.

WARNING
Risk of laser radiation exposure
A precautionary message with this symbol indicates a potential
risk of personal injury caused by exposure to a laser beam.

CAUTION
Risk of laser radiation exposure
A precautionary message with this symbol indicates a potential
risk of personal injury caused by exposure to a laser beam.

Safety standards

LG-Nortel products conform to all relevant safety standards. NS 16 1G NN-O

complies with the following safety standards:

• IEC/EN 60950-1:2001+A11:2004—Information technology equipment - Safety,

Part 1 : General requirements

• IEC 60825-1:2001 and IEC 60825-2:2004—Safety of Laser Products

• FDA 21 CFR 1040—Performance Standards for Light-Emitting Products

Laser radiation—eye safety hazards

LG-Nortel optical products use laser or light-emitting diode (LED) sources that

emit light energy into optical fibers. This energy is within the red (visible) and

infrared (not visible) areas of the electromagnetic spectrum. FDA 21 CFR 1040

Performance Standards for Light-Emitting Products

Laser radiation hazards

When operating the product normally, with all optical connectors in position and

correctly terminated, the optical radiation is completely enclosed. The system is

a Class 1(IEC)/Class I (FDA) product, regardless of the power transmitted within

the optical fiber.

If you have unterminated optical cables (breaks in the fiber-optic cable or

disconnected connectors) the output from circuit packs containing optical

transmitters does not exceed Class 1 (IEC)/Class I (FDA) and is therefore

considered safe under all reasonably foreseeable conditions.

The following text includes additional information on the laser for the NS 16 1G

NN-O.

Laser wavelength 1534 - 1560 nm Maximum laser output power <= 5 mW Standards: IEC 60825-1:2001 Edition 1.2

Using optical fibers

All activity described herein regarding the optical interface of the NS 16 1G NN-O

is intended only for trained personnel operating under the direction of the service

provider. Users and homeowners should not attempt to access or disconnect the

optical interface or damage the optical cable. Consult with the service provider

before undertaking any action involving the optical interface.

Handling optical fibers

When you work with optical fibers, you must take the following general precautions:

• Wear safety glasses when you install optical fibers.

> ⚠ **WARNING**
> **Risk of laser radiation exposure**
> Do not look directly into the optical beam. Invisible light can severely damage your eyes. Keep all optical connectors capped.

• Do not look into the opening of an optical fiber, or the opening of an optical fiber connector, if the optical fiber is active or the unit has the power turned on.

• Avoid direct exposure to optical fiber ends or optical connector ends where you can access the laser signal directly.

• Clean your hands after you handle optical fibers. Small pieces of glass are not always visible and can damage your eyes.

> ⚠ **DANGER**
> **Risk of eye injury**
> If you have a piece of a glass in your eye, get medical assistance immediately.

• Do not handle pieces of optical fiber with your fingers. Use tweezers or adhesive tape to lift and discard any loose optical fiber ends.

• Wear rubber gloves when you clean optical connectors. The gloves prevent direct contact with the isopropyl alcohol and prevent contamination of the ferrules with skin oils.

• Place all optical fiber clippings in a plastic container provided for that purpose.

• Handle optical fibers with caution. Place the optical fibers in a safe location during installation.

• Protect all optical fiber connectors with clean dust caps at all times.

• Follow the manufacturer instructions when you use an optical test set. Incorrect calibration or control settings can create hazardous levels of radiation.

Splicing optical fibers

When you must look at a spliced optical fiber with a small magnifier, take the following precautions:

• Power off all laser sources to the optical fiber or disconnect the remote optical fiber end from the laser sources before you start splicing. Make sure that all laser sources remain disconnected or have the power turned off.

• Disconnect all optical test sets from the optical fiber before you start splicing. The connections can be local or remote.

• Use only the optical instruments approved by your company.

Repairing optical fibers

When an accidental break occurs in the optical fiber, do the following:

• Report the location of the damaged optical fiber to both the service provider and

the field repair personnel.

• Power down all laser sources to the optical fiber or disconnect the remote optical

fiber end from the laser sources.

Working with power

DANGER
Risk of electrical shock
The (AC) mains connection from the power adapter to the power supply can be a shock hazard. Read and understand the power procedures you are performing. Take necessary precautions and use the appropriate insulated tools when working with power.

Other Warnings and cautions

WARNINGS

Do not disassemble this product.
This can cause poor performance of the product or result in a fire, or injury from electric shock. If you experience trouble, contact the service provider.

Do not expose this product to liquid or install this product in a humid location. If the product does get wet, contact your service provider.
This can cause poor performance of the product or result in a fire, or injury from electric shock.

If the product has an abnormal smell, noise or if you see smoke, disconnect the power or turn it off if it safe to do so and contact your service provider.
This can result in a fire, or injury from electric shock.

CAUTIONS

⚠ Keep the fiber connected at all times. Do not remove it.
It is recommended that the fiber remains connected in your fiber port. This will reduce the possibility of dust confamination which would im pact perfomance.

⚠ DO NOT pull on the optical cable.
This can cause poor performance and failure of the product.

⚠ Do not stack anything on this product.
This can cause poor performance and failure of the product.

⚠ DO NOT install the product in a dusty site.
This can cause poor performance or reduced life cycle of the product.

⚠ DO NOT install the product under direct sun rays or near heating appliances.
This can cause poor performance and failure of the product.

⚠ DO NOT install the product in a poor-ventilated site.
This can cause poor performance or reduced life cycle of the product.

⚠ Do not clean this product with any type of cleaning agents or water.
This can damage the product. Use a dry, clean cloth to remove dust.

Warranty: Customers can receive repair services for this product under specified conditions. This warranty does not cover failure or damage of the product caused from, using a power adapter other than the one provided, PC failures, data loss, or negligent treatment of the product.

Regulatory information

This chapter contains the following information:

• a list of global technical standards (electromagnetic compatibility, safety) to which the NS 16 1G NN-O complies

• a country-by-country list of specific regulatory text required by national authorities

• information on the regulatory labels affixed to the product (artwork and location on the product)

The list of global technical standards provided in this chapter is not exhaustive. The standards listed are generally regarded as the primary applicable electromagnetic compatibility (EMC) and safety standards. The conformity status on additional national and international standards not listed in this section can be provided upon request.

Compliance to applicable technical standards and regulations

The NS 16 1G NN-O meets or exceeds the following standards and requirements:

• (CFR Title 47, Chapter 1) FCC Part 15, Subpart B, Class B (USA)

• ICES-003, Issue 4, Class B (Canada)

• European Union EMC Directive (2004/108/EC)

• European "Low Voltage" Directive (2006/95/EC)

• EN 55022:2006 - Class B (European Community, Australia and New Zealand)

• EN 55024:1998 +A1:2001 +A2:2003 (European Community)

• EN 300 386 V1.3.3 (European Community, Australia and New Zealand)

• Australian Radiocommunications Labelling (Electromagnetic Compatibility) Notice 2008

• CAN/CSA-C22.2 No. 60950-1 (Canada)

• UL Std No. 60950-1 (USA)

• IEC/EN 60950-1:2001+A11:2004 (European Community)

• IEC/EN 60825-1:2001

• IEC/EN 60825-2:2004

Country-specific regulatory information

Canada

This Class B digital apparatus complies with Canadian ICES-003.

Cet appareil numérique de la classe B est conforme à la norme NMB-003 du Canada.

United States of America

This equipment has been tested and found to comply with the limits for a Class B digital device, pursuant to part 15 of the FCC Rules. These limits are designed to provide reasonable protection against harmful interference in a residential installation. This equipment generates, uses and can radiate radio frequency energy and, if not installed and used in accordance with the instructions, may cause harmful interference to radio communications. However, there is no guarantee that interference will not occur in a particular installation. If this equipment does cause harmful interference to radio or television reception, which can be determined by turning the equipment off and on, the user is encouraged to try to correct the interference by one or more of the following measures:

• Reorient or relocate the receiving antenna.

• Increase the separation between the equipment and receiver.

• Connect the equipment into an outlet on a circuit different from that to which the receiver is connected (consult with the service provider before proceeding).

• Consult the service provider or an experienced radio/TV technician for help.

Repairs to certified equipment should be coordinated by a representative designated by your service provider. Any repairs or alterations made by the user to this equipment, or equipment malfunctions, may give the service provider cause to request the user to disconnect the equipment.

Do not attempt to repair this equipment. If you experience trouble, contact the service provider.

European Union

The NS 16 1G NN-O conforms with the essential requirements of Directive
2004/108/EC (EMC Directive), Directive 2006/95/EC (Low Voltage Directive)
compliance to the following harmonized standards:

• EN 55022:2006 (Class B)

• EN 55024:1998 +A1:2001 +A2:2003

• EN 300 386 V1.3.3 (Class B, other than telecommunications centres criteria)

• EN 60950-1:2001 +A11:2004

• EN 60825-1:2001

• EN 60825-2:2004

The product bears the CE mark as illustrated in the Figure on page 13.

A signed Declaration of Conformity is available upon request.

Regulatory labels (Safety and EMC)

The following labels have been placed on the system and various field replaceable
units (FRU).

The main product-level regulatory label is located on the bottom of the NS 16
1G NN-O. See the Figure on page 13. The label bears the product name, power
ratings information, certification and other regulatory marks and informational
disclosures required by jurisdictional authorities.

After reading through this User's Manual, please keep it handy for easy reference.

About NS 16 1G NN-O

Thank you for selecting LG-Nortel NS 16 1G NN-O.

The NS 16 1G NN-O is ONT equipment which is located at the Customer premises end of a TurboLIGHT16 WDM-PON (Wavelength Division Multiplexing - Passive Optical Network) system.

The NS 16 1G NN-O converts 1.25 Gbps Gigabit Ethernet signal into WDM-PON optical signal which is transmitted to OLT through RN and getting WDM-PON optical signal from the RN in convert into 1.25 Gbps Gigabit Ethernet signal.

These products will allow you to use the different services such as VoD (Video on Demand), EoD (Education on Demand), IP-TV and High speed internet access available from your provider.

Unit Description

Product front view

NS 16 1G NN-O
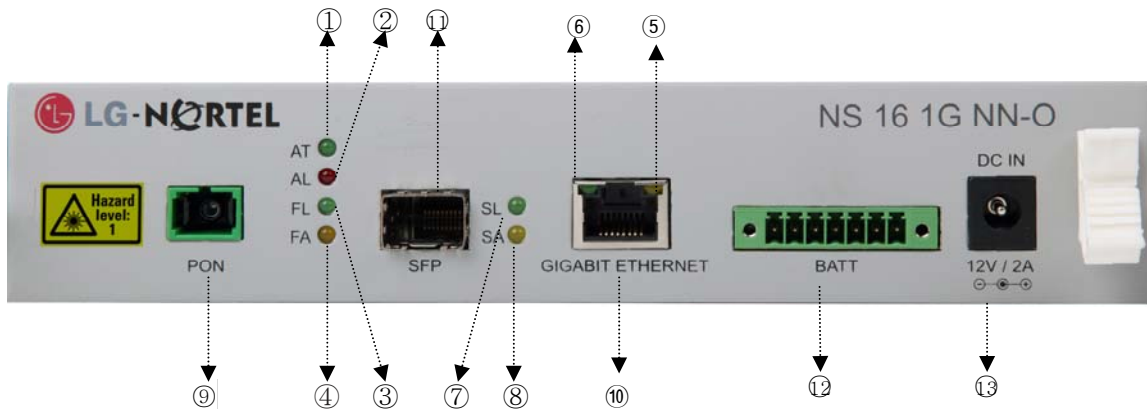
NS 16 1G NN-O Front LED and Descriptions

Number	LED	Color	Status	Description
①	AT	Green	On	Is lit when link is active
②	AL	Red	On	Is lit when alarm occurs
③	FL	Green	On	Is lit when optical link is connected to service provider through TL16 system
④	FA	Yellow	On	Is lit and blink when the device sends/receives data to/from equipment of the service provider through TL16 system
⑤	TL	Orange	On	Is lit when Ethernet link is connected
⑥	TA	Green	On	Is lit and blink when the device sends/receives data to/from equipment of the service provider.
⑦	SL	Green	On	Is lit when SFP optical link is connected
⑧	SA	Yellow	On	Is lit and blink when the device sends/receives data to/from equipment that is connected by SFP

NS 16 1G NN-O Front Panel Port Descriptions

Number	Port	Type	Description
⑨	Optical port	SC/APC Adaptor	This port (optical) should be accessed only by the service provider. It is the access point to the service provider's network.
⑩	Ethernet port	RJ-45	This port is Ethernet port that will connect to user devices supporting 10/100/1000 Mbps by NS 16 1G NN-O
⑪	SFP port	SFP connector	This port to be connected to other Ethernet equipments by SFP optical module
⑫	Power port	DC with monitor	This port is to connect to DC power with power monitor (battery connection)
⑬	Power port	DC to adaptor	This port is to connect to DC power (power adaptor connection)

NS 16 1G NN-O with lables
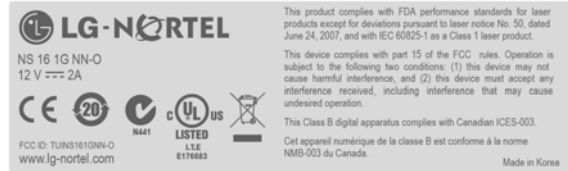
Specifications of NS 16 1G NN-O

Item	Specification
Dimensions in mm	197.4(w)x232.4(d)x40(h)
Power DC	12V, 2A
Ambient Temperature	-40℃ to 65℃
Humidity	5% to 90%
Technical standards	EN 300 386 (Class B, other then Telecom Centres) FCC part 15 (CFR 47) (Class B) EN 55022 (Class B) / 55024
Data rate	1.25Gbps
Connectors	SC/APC or SFP (optical), RJ45 (Ethernet)
LED indicators	Link status, Alarm, optical port status, Ethernet port status

Checking package contents

Before installing this product, ensure all parts are provided.

Check the package to make sure the following items are included.

NS 16 1G NN-O Main body   User manual   Setback bracket kit
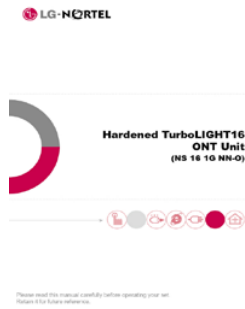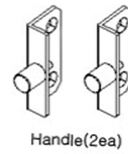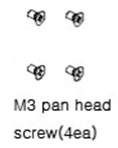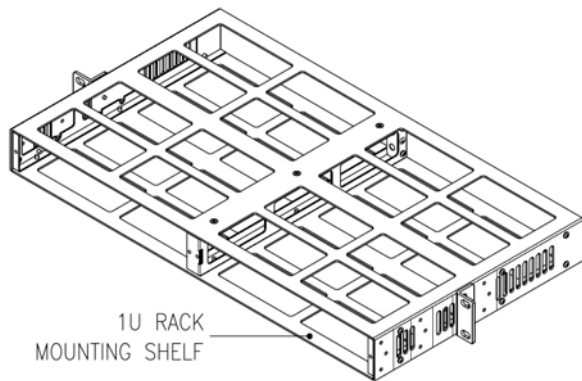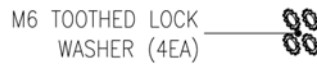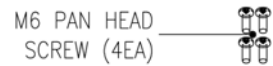

1U Rack mounting shelf kit

Installing NS 16 1G NN-O

This section provides the specifications for NS 16 1G NN-O installation, it also

describes how to install it and connect it into a network.

Installation environments

Install the NS 16 1G NN-O in an environment where the following specifications are

- Operating temperature: -40℃ to 65℃

- Relative humidity: 5% to 90%

- Power consumption: Watts (Max Watts)

- Input voltage: 12V DC Power, 2A

Preparing for installation

Before you install the NS 16 1G NN-O, review following information.

| Item	Quantity	Supplied
Main body of NS 16 1G NN-O	1	yes
SFP module	as required	no
Setback for NS 16 1G NN-O	1	yes
Ethernet (RJ-45) cable for network access	as required	no

Installing the product

Mounting method

⚠️CAUTION

Do not block any ventilation openings when mounting.

Minimum 1U (44.45mm) gaps are required between NS 16 1G NN-O equipment and neighboring equipments.

STEP 1: Install the 1U rack mount kit on the rack using 4 M6 screws and 4 lock washers. Tighten the screws to 4.8 Newton meters of torque.
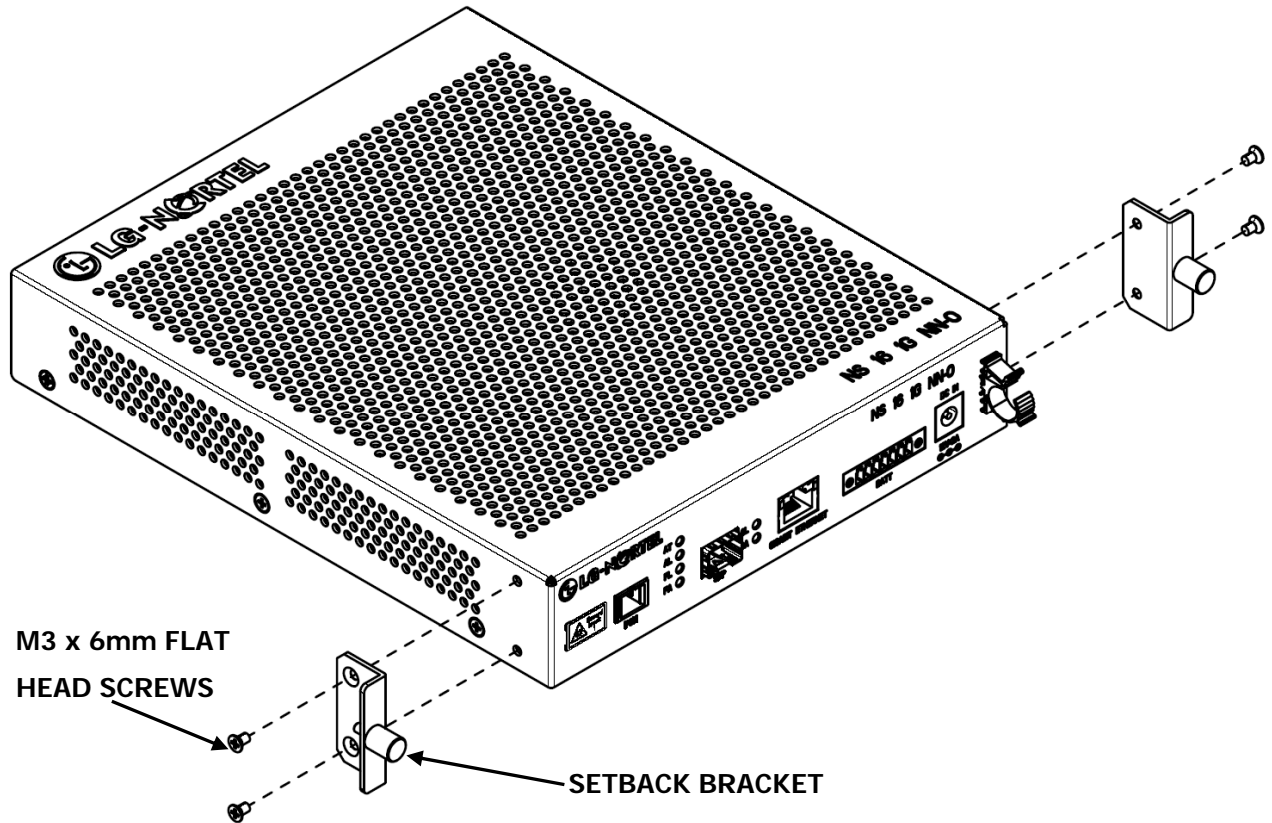

M6 toothed lock washers

M6 Pan head screws
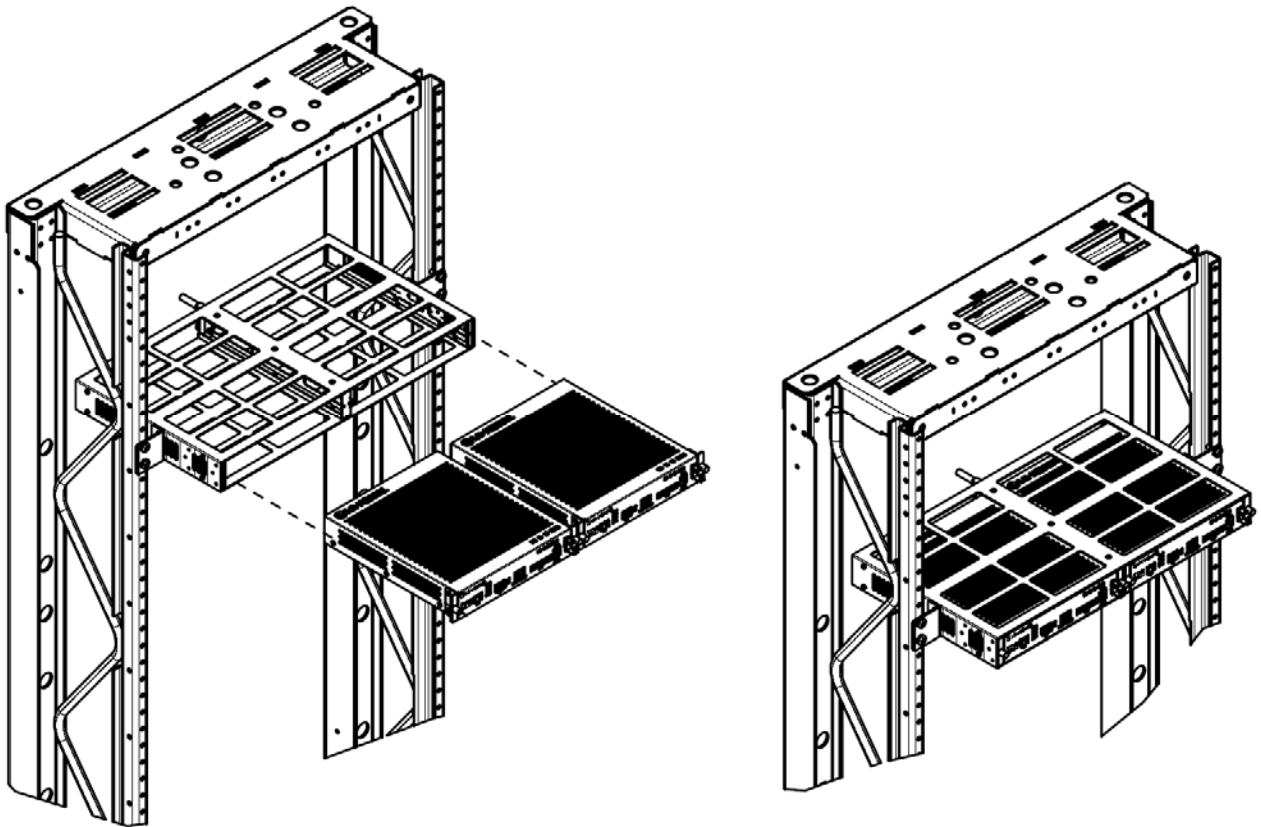
1U Rack mounting shelf
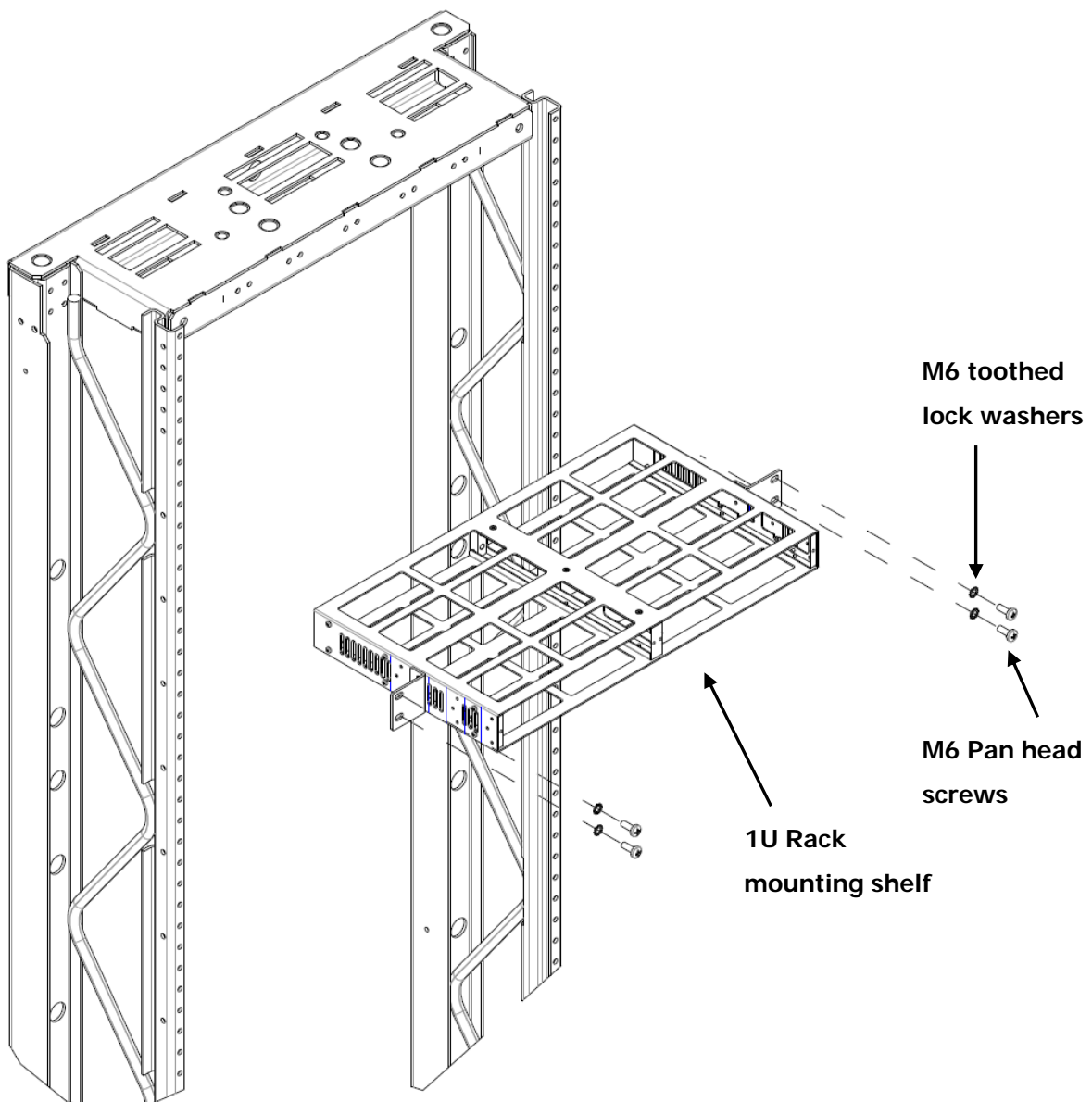
Mounting method (continued)

STEP 2: Unfasten the M3 pan head screws from each side of the NS 16 1G NN-O (see following illustration). Tighten the screws to 1 Newton meter of torque.

STEP 3: Attach the set back brackets using the screws that were removed in STEP 2.

M3 x 6mm FLAT HEAD SCREWS

SETBACK BRACKET

Mounting method (continued)

STEP 4: Insert the EABU into the rack mount and tighten the M3 captive fasteners on the setback bracket in order to secure it to the rack mount.

Grounding

STEP 1: Unfasten the grounding screws on the rear side of the 1U Rack mounting shelf (see following illustration).

STEP 2: Attach the 2-hole lug using the screws that was removed in STEP 2. Tighten the screws to 4.8 Newton meters of torque.

A 2-hole #10 compression with 6.6mm(0.26inch) hole spacing is acceptable for the NS 16 1G NN-O. The grounding connection is suitable for terminating a #6 AWG wire.

2-hole lug

Grounding screws

1U Rack mounting shelf
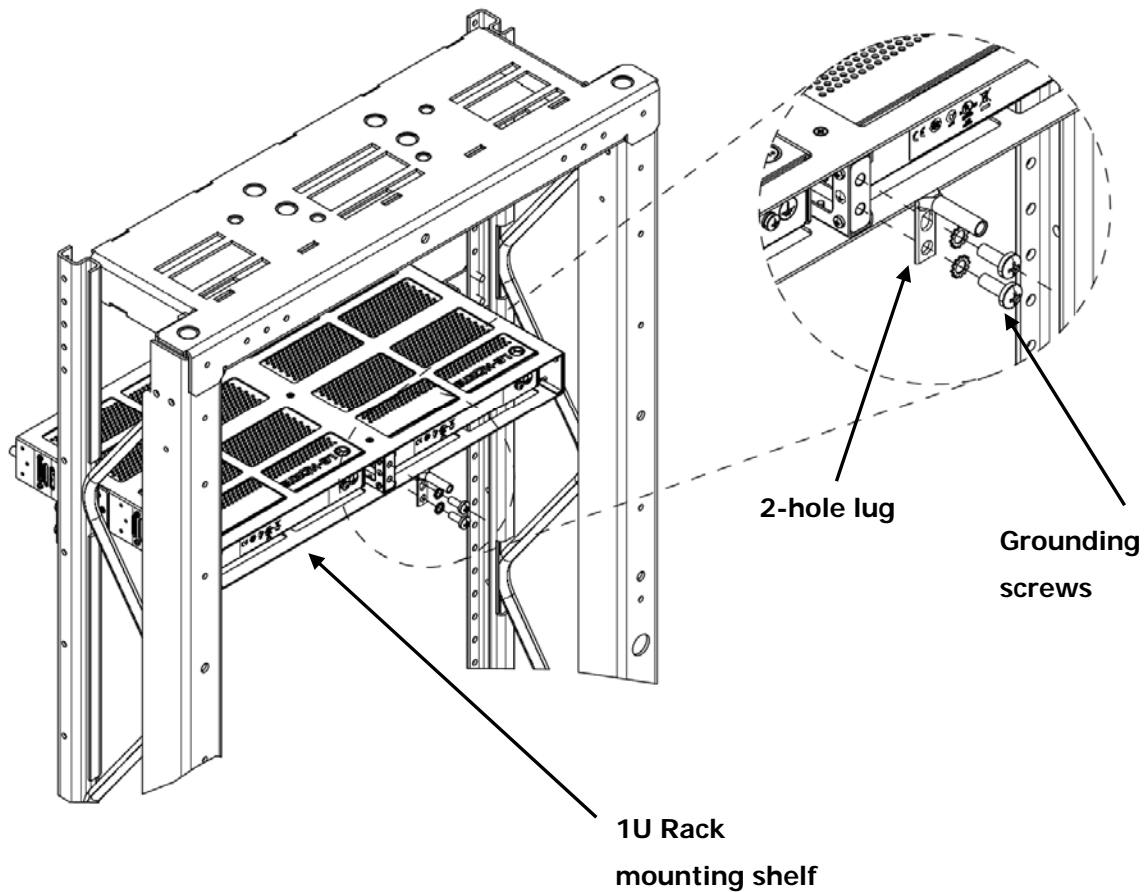
Connecting power cable

For AC/DC adaptor connection

Lift up the cable retaining clip and connect the AC power cable.

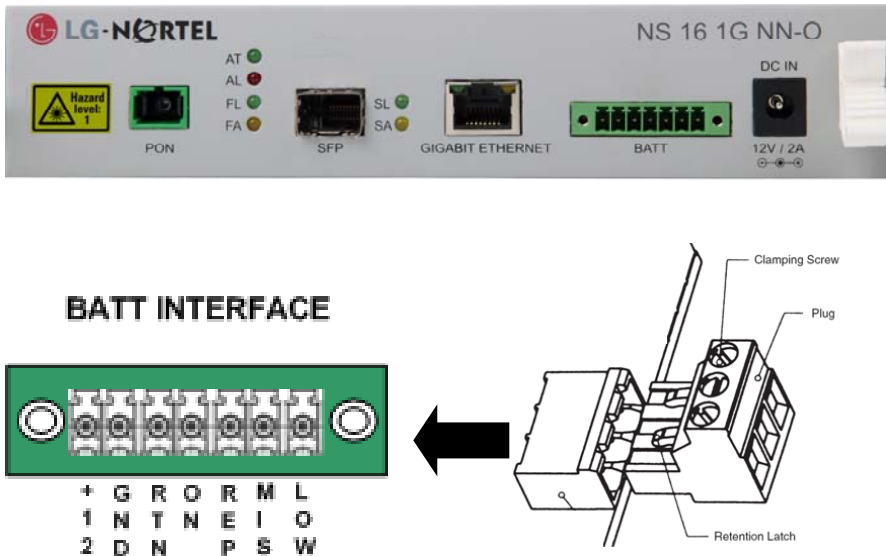Pull down the cable retaining clip to lock in the power cable.

The AC power cable must comply with "IEC60320 C14"

Cable retaining clip

AC/DC power adaptor

For Battery connection

Connect the Battery plug to BATT interface.

Mark	Signal Name	Description
+12V	+ Voltage	+ Voltage
GND	- Voltage	- Voltage
RTN	Signal Return	Signal Return
ON	On Battery	Low when operating from utility line. Open when operating from battery.
REP	Replace Battery	Low when battery is charged. Open when battery fails the Self Test.
MIS	Battery Missing	Low when battery is present. Open when battery is missing.
LOW	Low Battery	Low when battery is near full charge capacity. Open when operating from a battery with < 20% capacity.

⚠️CAUTION

Do not pull on the power cable. This can cause failure or damage to the NS 16 1G NN-O.

Connecting optical cable

Check that the power switch on the NS 16 1G NN-O is in the off position. Insert the SC APC connector into the optical port of the NS 16 1G NN-O. Insert the other end of the APC optical cable into the optical outlet on your wall.

⚠ CAUTION
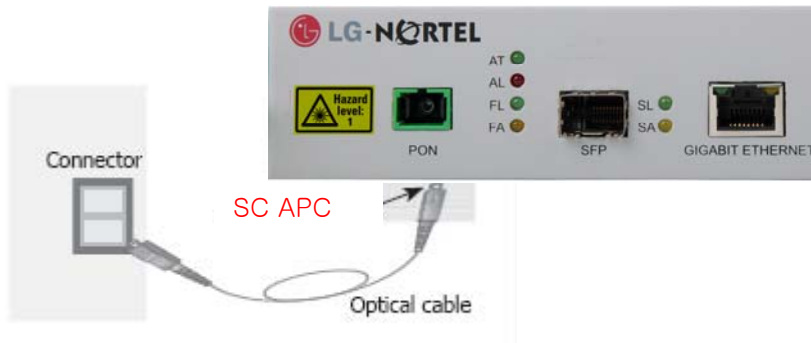
Only SC APC connector should be used. Other connector types will not work properly.

Connecting Ethernet cable

Connect Ethernet cables to the RJ45 Ethernet port numbered 1 to 4 in NS 16 1G NN-O.

Connect the other side of the Ethernet cable to the Ethernet port of your home device.

Checking the connection status

Checking the connection status of service provider line (Link)

When the NS 16 1G NN-O is first powered on, the AL LED should turn red momentarily. Once communication is

established this LED turns off. The AT LED should turn green and blink.

AL LED   AT LED
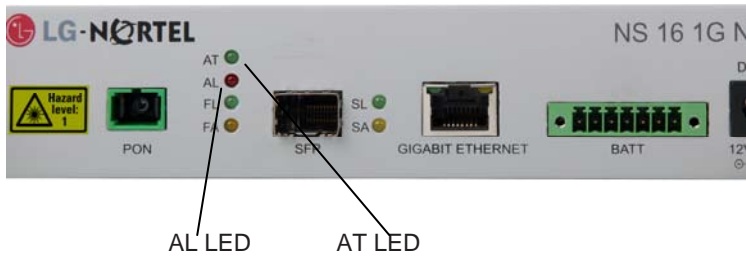
Checking the connection status of user devices

When NS 16 1G NN-O is power-fed, the Green and Orange LEDs should be on. The green LED is the data indicator. It blinks when data is being transmitted or received. The orange LED is the link indicator. It lights up with a 100Mbps connection. If there is a 10Mbps connection (a 10BaseT connection), the orange LED is off.
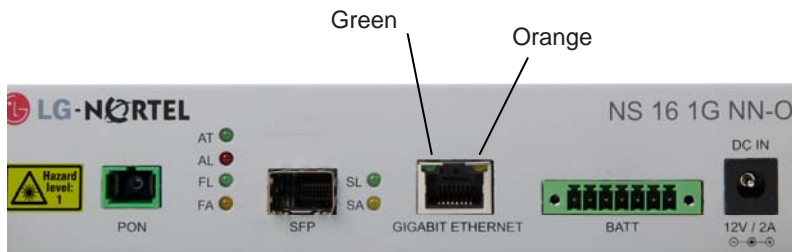
Setting NS 16 1G NN-O

When you select to receive WDM-PON service, you do not have to make additional settings on the product to use it.

Using Internet

With a web browser such as the Internet Explorer on your PC, you can surf freely through the Internet.

Note

NS 16 1G NN-O does not require any access program.

Use your regular internet browser.