

# NBN<sup>®</sup> BUSINESS EQUIPMENT LOCATION GUIDE

## Standards

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## Document control

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Date	Revision	Details
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21 JUN 22	7.0	<ul style="list-style-type: none"><li>Updated for inclusion of 2 – 10GE BNTD</li><li>Updated to include External Cabinets for 1Gbps BNTD.</li></ul>
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08 JUL 19	2.0	<ul style="list-style-type: none"><li>Minor grammatical updates</li><li>Aligned "Customer" references with WBA terminology in Section 4</li></ul>
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# 1 About this document

## 1.1 Purpose

This document outlines the minimum requirements for locating nbn® Ethernet (Fibre) and nbn® Enterprise Ethernet equipment within business customer premises.

## 1.2 Objective

The objective is to define the nbn location requirements for nbn® Equipment and to provide detailed information to business owners to determine the ideal location for the customer's nbn® Equipment which, if followed will provide the optimal installation experience.

## 1.3 Scope

### 1.3.1 In scope

- nbn® Ethernet (Fibre) Network Terminal Devices (NTD)
- nbn® Enterprise Ethernet Business Network Terminal Device (BNTD)
- In building fibre cabling
- Power requirements
- Passive fibre products

### 1.3.2 Out of scope

- Integration commissioning
- Operational use of nbn® Equipment

## 1.4 Health, safety and environment (HSE)

nbn takes health, safety and environment management very seriously, and expects the same with all internal employees as well as Delivery Partners. Whilst undertaking the activity associated with this document, all workers (both nbn employees and delivery partner's employees) must comply with relevant HSE legislation, their own HSE processes, and nbn contractual HSE obligations. This includes compliance with nbn's HSE Critical Risk Controls and Guidance. The Critical Risk Controls (CRC) set out nbn's minimum expectations for carrying out work where there is a risk of exposure to one or more of the following HSE critical risks.

The Critical Risk Controls set out nbn's minimum expectations for carrying out work where there is a risk of:

1. Asbestos Containing Material
2. Confined Spaces and Manholes
3. Driving and Remote Work

4. Electrical Safety
5. Electromagnetic Emissions
6. Environment Protection
7. Laser Safety
8. Mobile Plant
9. Traffic and Pedestrian Management
10. Underground and Concealed
11. Working at Height

The mandatory requirements specified in the nbn® HSE Critical Risk Controls and Guidance are in addition to other requirements under contractor legislation and do not replace or limit any nbn or Delivery Partner obligation to manage HSE risks. It is also important to note that the Critical Risk Controls are not exhaustive of all controls required to manage HSE risks.

The information within this document has been prepared with an understanding that HSE risks may be evident and will require assessment with due consideration to CRC requirements by nbn or the Delivery Partner participating in any activity prescribed within the document and controls are documented in relevant safe work systems (e.g. SWMS, Procedure etc.) and adhered to.

All works and locations need to comply with the latest version of [3] Building Code of Australia (BCA), [1] AS/NZ 3000 Electrical Installations (known as the Australian/New Zealand Wiring Rules) and [2] AS/CA S009 Installation Requirements for Customer Cabling (Wiring Rules).

## 1.5 Audience

The intended audience for this document is:

- Building owner/Manager
- Customer
- nbn® Delivery Partners (DPs)

## 1.6 Referenced documents

**Note:** The table below only contains documents referenced within this document

Document	Owner
[1] AS/NZ 3000 Electrical Installations (known as the Australian/New Zealand Wiring Rules)	nbn
[2] AS/CA S009 Installation Requirements for Customer Cabling (Wiring Rules)	nbn
[3] Building Code of Australia (BCA)	Australian Building Codes Board (ABCB)

## 1.7 Changes in this revision

Changes in this document revision 8.0 dated 22 MAY 25 compared to the previous revision 7.0 dated 15 JUN 22 are summarised below:

Section	Details
Throughout document	<ul style="list-style-type: none"><li>Minor wording and section heading updates for clarity and consistency.</li></ul>
1.6 Referenced documents	<ul style="list-style-type: none"><li>Added new section.</li></ul>
4 External 1GE BNTD cabinets/enclosures	<ul style="list-style-type: none"><li>Added 'E' to '1GE'.</li></ul>
5 nbn® Ethernet FTTP NTD (and sub-sections)	<ul style="list-style-type: none"><li>Added details and photos for new 1-port and 4-port NTD and adjusted details for the legacy NTD.</li></ul>
6.1.4 BUDI-S and BUDI-M	<ul style="list-style-type: none"><li>Deleted Figure 21. nbn Budi.</li></ul>



## 2 General requirements

### 2.1 Minimum installation requirements

The following minimum installation requirements apply:

- The NTD or BNTD and Power Supply Unit (PSU) must be located in an area or room that is secure, lockable and controlled by the customer.
- All nbn® equipment shall be mounted at a comfortable working height and have sufficient access space around the NTD/BNTD for initial installation, ongoing maintenance, configuration modifications and troubleshooting.

### 2.2 Responsibilities

#### 2.2.1 Building owner/customer

The Building owner/customer is responsible for the following:

- Provision of suitable space that allows access for the installation, maintenance, and repair of all nbn® network elements up to the network boundary point (NBP).
- Provision of power to NTDs or BNTD equipment as outlined by the specific technology being deployed that comply to [1] AS/NZ 3000 Electrical Installations (known as the Australian/New Zealand Wiring Rules).
- Provision of valid earth connection point with connectivity to a building earth where required that comply to [1] AS/NZ 3000 Electrical Installations (known as the Australian/New Zealand Wiring Rules).

#### 2.2.2 nbn

nbn is responsible for:

- The cabling, installation, and maintenance of all network elements up to and including the NBP. In this case, the NTD or BNTD and associated PSU, except for the maintenance of optional batteries if battery back-up option has been selected and supplied at the time of installation.
- Compliance to the [3] Building Code of Australia (BCA) for all cabling and with reasonable directions provided by authorised building owners or managers in respect to building and fire authority requirements. Advice may be sought in instances where a building request is regarded as unreasonable.

## 3 nbn® 1Gbps and 2–10 Gbps Enterprise Ethernet

The nbn® Enterprise Ethernet service is provided by a Business Network Terminal Device (BNTD). A 7210 SAS-K ETR is supplied for 1GE and a 7210 SAS-DXP ETR AC for 2–10GE service levels.

The BNTD can be installed in either an existing customer network communication rack or an nbn® supplied wall mount option, depending on rack availability, or the customer's preference.



Figure 1. Business nbn® 1GE BNTD 7210 SAS-K and 2 -10GE 7210-SAS-DXP ETR AC

### 3.1 Rack mount BNTD

The customer's rack must meet the following requirements:

- 19" or 21" with a minimum depth of 350mm
- Minimum space of 3 RU (which will consist of 2 RU for the BNTD tray and mandatory clearance and 1RU for the fibre management tray).
- Good construction with no visible signs of damage.
- In an accessible and secure location with a recommended front clearance of 900mm.
- Located within an environment suitable for telecommunications and electrical hardware i.e. internally within the main building of the customer.
- Fixed and either floor or wall secured with fixings.
- Enclosed with a door or allow BNTD tray mounting set back to protect BNTD and cabling
- AC or DC power and earth connections available that comply to AS/NZS 3000:2018.
- BNTD or fibre tray not installed at a height greater than 2.4 m, with the preferred height below 1.8 m
- BNTD tray not located at ground level

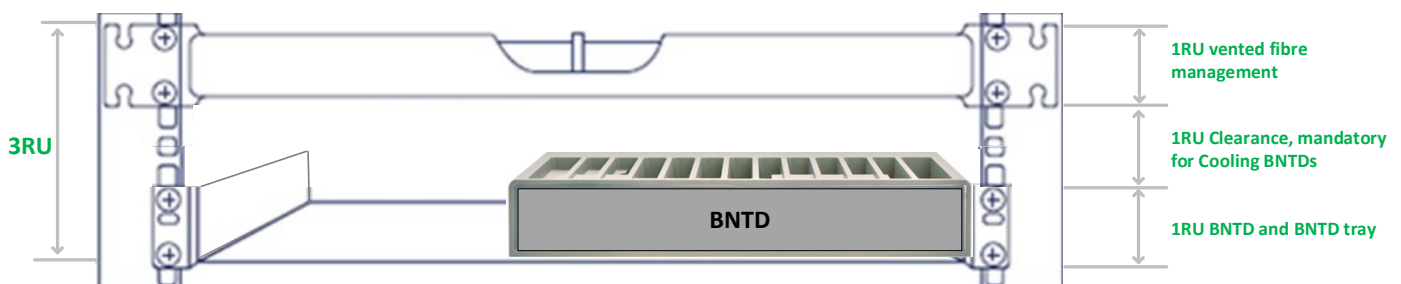


Figure 2. Typical rack mounted BNTD arrangement

### 3.1.1 Prohibited locations

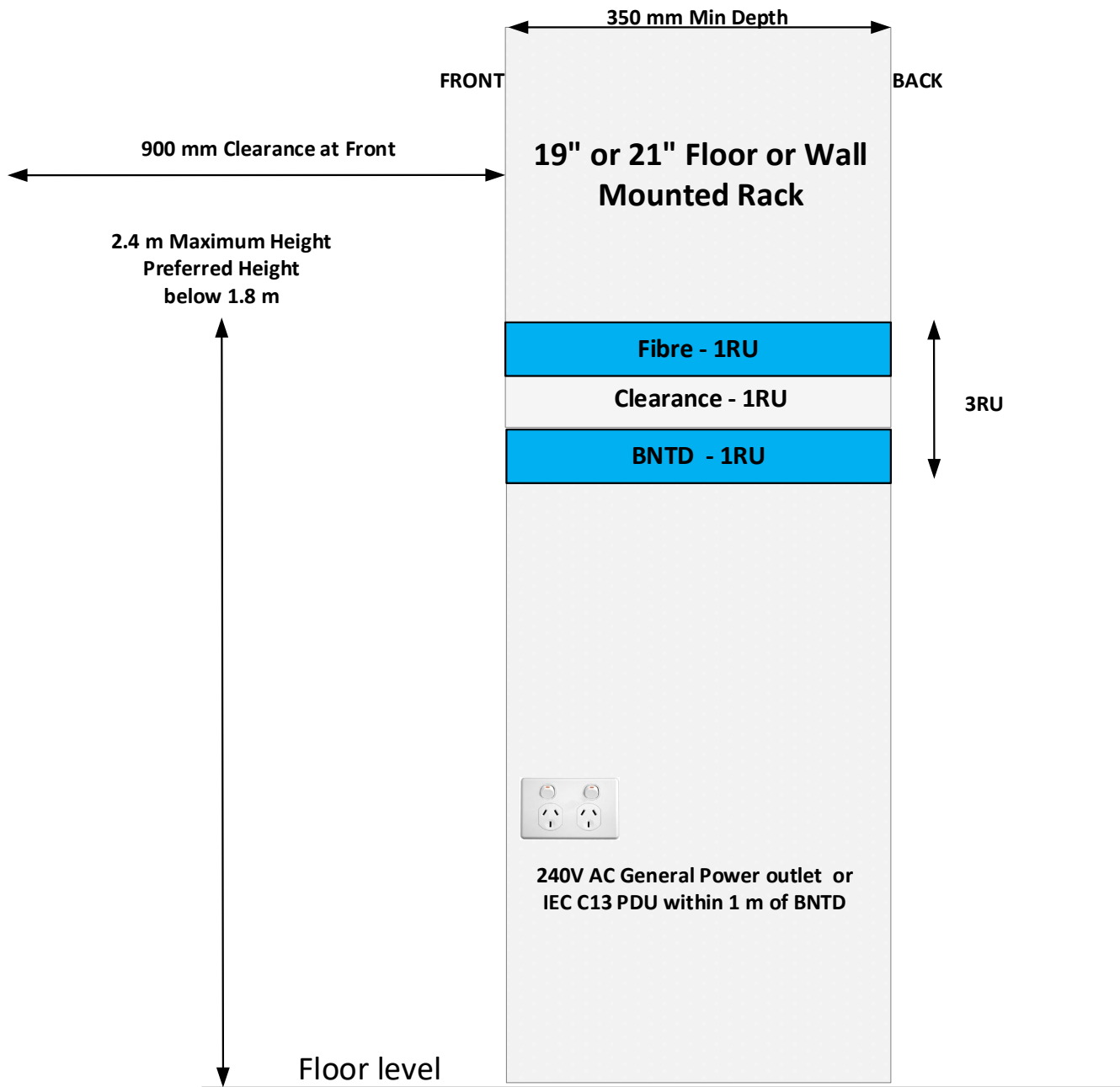
nbn will not be able to use an existing rack located in any of the following locations:

- In a boiler, plant or machine room
- In areas of return air supply i.e. areas likely to be contaminated by return air, exhaust air systems and smoke extraction
- In areas subject to extreme or rapid temperature changes or, temperature/humidity likely to cause condensation in equipment rack(s)
- In areas where corrosive or flammable fumes or fluids are used or stored
- In a fire escape stairway
- In a fire control room or anywhere that restricts access to a fire control centre or panel
- In a cupboard containing a fire hose reel
- Wet areas including locations near baths, showers, basins, tubs, fixed water containers, spa pools, spa tubs, swimming pools, fountains, water features or water pumps
- Within 1.5 m of water basin or sink
- Within a refrigeration room or diesel generator room
- Within an earth potential rise hazard zone
- In an area exposed to outdoor weather conditions or external walls
- Under floors or basements with reduced heights / in false ceilings / attics or roof spaces
- Within 0.5 m from a heater or air conditioner unit
- Within a defined hazardous area
- In a stairwell
- In unsecured communal areas
- In hallways or passageways
- Car parks

### 3.1.2 Clearance requirements

The existing customer rack should have clear access from the front of the rack.

To allow ease of installation and nbn personnel to have sufficient access to be able to install and maintain the nbn® Equipment within the rack, 900mm is recommended.



**Figure 3. BNTD installation rack front clearance – side view**

### 3.1.3 Power requirements

The customer shall provide power and earthing for either DC or AC powered racks. All the DC or AC PSUs, and BNTDs must be connected to earth. All earthing and power connections points shall be compliant with [1] AS/NZ 3000 Electrical Installations (known as the Australian/New Zealand Wiring Rules).

**AC Power** – customer to provide a 240V AC socket as a General Power Outlet (GPO) with 3 pin, flat Pin 10A socket as either a:

- wall mounted socket or
- as part of a rack mounted PDU (Power Distribution Unit)

Rack mounted power can also be supplied via an AC PDU with IEC C13 sockets (10A 3 conductor pin).

**DC power** – customer to provide a 2A circuit breaker on the 48V DC distribution panel and DC cable termination points, and an earth provided via a communications earth system (CES) with connection via a communication earth terminal (CET) or Rack Earth Termination point to the main building earth.

**Note:** Any earthing connections points provided by the customer shall be compliant with [2]AS/CA S009 Installation Requirements for Customer Cabling (Wiring Rules) and [1]AS/NZ 3000 Electrical Installations (known as the Australian/New Zealand Wiring Rules).

AC powered rack mount PSUs and BNTD installations shall be equipotentially bonded to the building earthing system by either of the following two options:

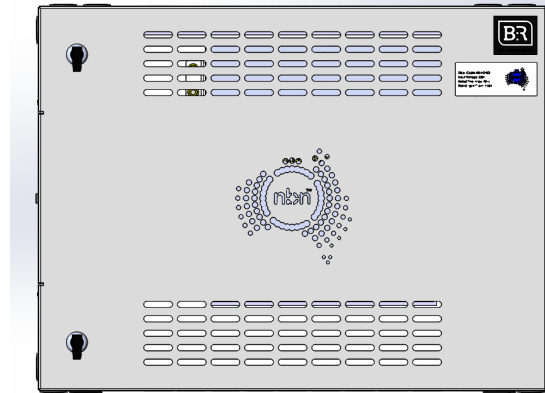
- **Option 1** - Directly to the electrical earthing system via a Protective Earth Conductor (with the Earth conductor provided from a GPO (General Power Outlet) via the standard 3 Pin IEC-C13 10A AC Power Lead being utilised).

Earth connection shall be validated by nbn using a socket and see plug in tester, prior to use of the GPO.

- **Option 2** - Earth provided via a communications earth system (CES) with connection via a communication earth terminal (CET) or Rack Earth Termination point to the main building earth.

## 3.2 Wall mount BNTD

nbn have a wall mount version of the BNTD. The BNTD and AC PSUs (wall mount is AC only) are housed within a powered coated metallic enclosure that can be fixed to a suitable wall within the customer's premises.



**Figure 4. Wall mount BNTD solution**

The wall mount installation is required to meet the following requirements:

- The wall selected for installation of the equipment needs to be flat and suitably constructed for fixing the enclosure with standard wall fixings.
- Accessible secure internal/lockable location for installation of nbn® equipment.
- Within 1000mm from a standard 240V GPO (**note:** if this maximum distance cannot be achieved, an nbn Technician will discuss options with the customer or their nominated representative).
- Recommended front clearance of 900mm, side clearance of 15mm and top and bottom clearance of 50mm.
- As a minimum there should be sufficient clearance to access the equipment and to be able to stand in front of the wall enclosure for installation and maintenance without anything in the way.
- The height of the enclosure should be 1200mm from the ground where possible but can be installed as low as 500mm from floor level.
- The top of the enclosure should not exceed 2.4m in height from ground level, preferred height below 1.8m.

### 3.2.1 Prohibited locations

nbn will not be able to install the wall mount BNTD in any of the following locations:

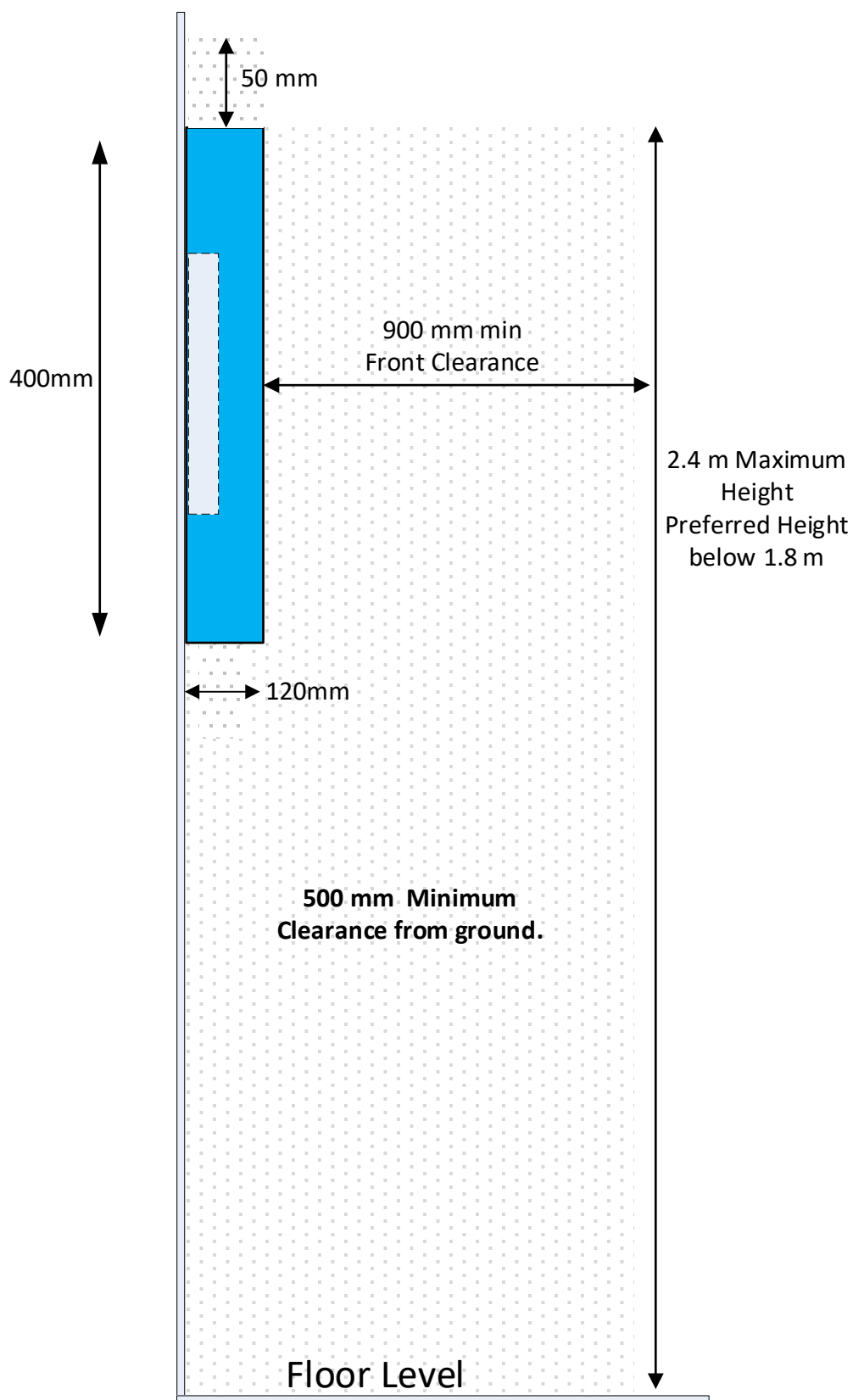
- In a boiler, plant or machine room
- In areas of return air supply i.e. areas likely to be contaminated by return air, exhaust air systems and smoke extraction
- In areas subject to extreme or rapid temperature changes or, temperature/humidity likely to cause condensation in equipment rack(s)
- In areas where corrosive or flammable fumes or fluids are used or stored

- In a fire escape stairway
- In a fire control room or anywhere that restricts access to a fire control centre or panel
- In a cupboard containing a fire hose reel
- Wet areas including locations near baths, showers, basins, tubs, fixed water containers, spa pools, spa tubs, swimming pools, fountains, water features or water pumps
- Within 1.5m of a water basin or sink
- Within a refrigeration room or diesel generator room
- Within an earth potential rise hazard zone
- In an area exposed to outdoor weather conditions or external walls
- Under floors or basements with reduced heights / in false ceilings / attics or roof spaces
- In locations where the wall mount is likely to have materials resting against the BNTD / PSU
- Within 0.5 m from a heater or air conditioner unit (wall mount)
- Within a defined hazardous area
- In a stairwell
- In unsecured communal areas
- In hallways or passageways
- Car parks

### 3.2.2 Clearance requirements

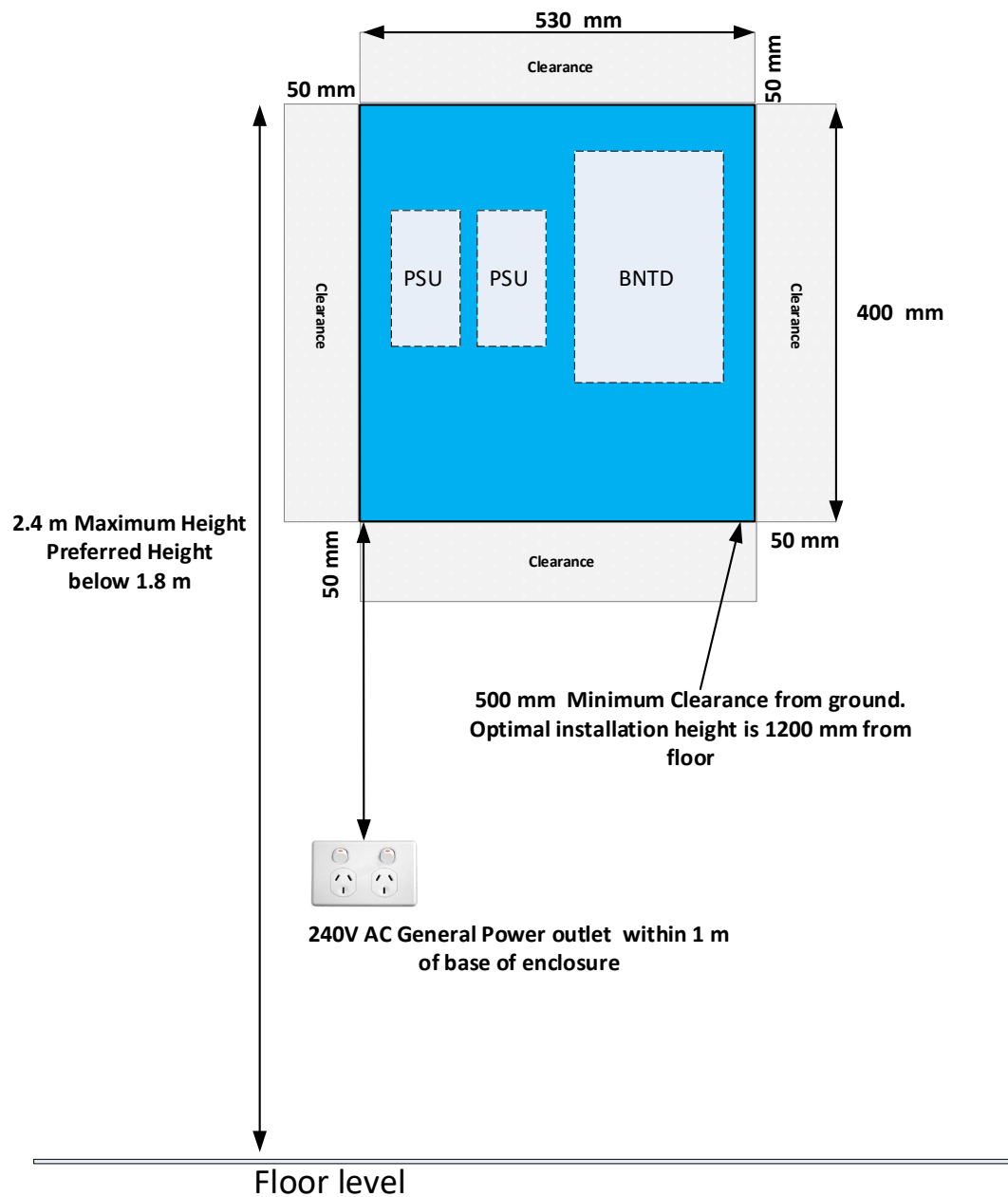
The wall mount has clearance requirement for installation, operation, and maintenance of the equipment.

- Recommended front clearance of 900mm as a minimum and there should be sufficient clearance to access the equipment, and to be able to stand in front of the wall plate for installation and maintenance without anything in the way (**note:** this can be achieved when a closed cupboard door is opened to access the BNTD).
- Side clearance of 50mm is required to allow sufficient clearance for installation and allowing passive ventilation.
- Top and bottom clearance of 50mm from the enclosure to allow cable installation and passive ventilation.



**Figure 5. Wall mount BNTD clearances - side view**





**Figure 6. Wall mount BNTD clearances - front view**

### 3.2.3 Power requirements

The customer shall provide an AC 240V General Power Outlet (GPO) 3 pin flat Pin 10A socket point of connection for each PSU.

All earthing and power connections points shall be compliant with [1] AS/NZ 3000 Electrical Installations (known as the Australian/New Zealand Wiring Rules).

Wall mounted PSUs and BNTDs installation shall be within 1000mm of the 240V GPO wall mount socket and shall be equipotentially bonded to the building earthing system by either of the two options detailed below:

- **Option 1** - Directly to the electrical earthing system via a Protective Earth Conductor (with the Earth conductor provided from a GPO (General Power Outlet) via the standard 3 Pin IEC-C13 10A AC Power Lead being used).
- **Option 2** – Earth provided via a communications earth system (CES) with connection via a communication earth terminal (CET) or Rack Earth Termination point to the main building earth.
- Wall mount solution to be located adjacent to the CET with a preference for the CET to be located within 2m.

**Note:** Power and earthing connection points provided by the customer shall be compliant with [1] AS/NZ 3000 Electrical Installations (known as the Australian/New Zealand Wiring Rules).

## 4 External 1GE BNTD cabinets/enclosures

External cabinets/enclosures that have been supplied by the customer and designed to manage telecoms or other active equipment externally may be used for the installation of 1GE, 7210 SAS-K ETR BNTD rack solutions or wall mounted solutions.

Any cabinet used for nbn 1GE equipment must meet the requirements in the following sections.

### 4.1.1 Location

External locations shall:

- Be within a premises or approved non-premises (as per nbn's approved non-premises list).
- Be within the customer's property boundary i.e. not in a public footpath, on a highway or council owned land.
- Not be located in known hazardous area.
- Not be located in an EPR zone.
- Not be located on roads, driveways, or access/egress pathways or within a designated car park space.
- Provide clear access for nbn internal workforce and delivery partners to access with a front clearance minimum of 900mm.
- Be located to prevent nbn internal work force or delivery partners encroaching any vehicle pathway while accessing the cabinet
- Be located where access can be gained via standard vehicles or pedestrians

### 4.1.2 Cabinet/enclosure specifications

The cabinet/enclosure shall:

- Be fixed to a concrete plinth or hard standing or if wall mounted secured to a suitable wall of a structure or building below 1.8 m height.
- Have an IP rating Minimum IP 55.
- Able to maintain -40°C to +65°C internal temperature.
- Able to satisfy a range of 5% to 95% non-condensing humidity.

If other active equipment is present, then the cabinet should be equipped with at least one of the following to aide cooling:

- Temperature monitoring by customer
- In built cooling fans
- In built ventilation
- Solar shields inbuilt or external to the enclosure cabinet

The cabinet/enclosure shall be:

- Lockable to prevent unwanted access.

- Accessible to nbn as required (customer to provide access or key).
- Secure construction to prevent unwanted access or malicious damage.
- Have a minimum 3 RU rack space.
- 19 inch or 21 inch mounting and minimum 350mm deep or equivalent wall space to allow nbn wall mount enclosure to be installed.

### 4.1.3 Customer supplied power

The cabinet/enclosure shall support AC BNTDs PSUs only and shall provide:

- 230V AC Power with GPO or PDU with IEC C13 Sockets
- Earthing via either validated GPO or CES (communications Earth System) available.
- Power and earthing connections points provided by the customer shall be compliant with t[1]AS/NZ 3000 Electrical Installations (known as the Australian/New Zealand Wiring Rules).

### 4.1.4 Fibre access

The cabinet/enclosure shall:

- Be capable of managing and securing nbn 1f Fibre cables.
- Have suitable access ports/glands for single 1f cable.
- Have suitable Internal/external (lead in conduit) pathways for nbn Fibre.
- Allow standard fibre termination as per the rack or wall mount solutions.

#### 4.1.4.1 Fibre termination

nbn fibre 1f cables can enter directly to the fibre management tray and terminate with the splice tray for the rack or the Fibre Wall Outlet (FWO) with the wall mount solutions with no requirement for the installation of a Premises Connection Device (PCD).

### 4.1.5 Examples of external telecommunications cabinets/enclosures



**Figure 7. Examples of external rack mount and wall mount customer supplied telecoms cabinet/enclosure**

## 5 nbn® Ethernet FTTP NTD

End User's supplied with an nbn® Ethernet (GPON Fibre) connection have the option for either the standard wall mount NTD or a rack mount NTD depending on site suitability and customer preference.

For Business Deployment GPON (Gigabit Passive Optical Network) installations, nbn has three NTDs that can be utilised. The Legacy Indoor NTD, Nokia I-240GR (shown in Figure 10) is being phased out and replaced with a 1-port (shown in Figure 8) and a 4-port (shown in Figure 9) GPON NTD. There are two manufacturers (Nokia and Sercomm) for both the 1-port and 4-port NTD.

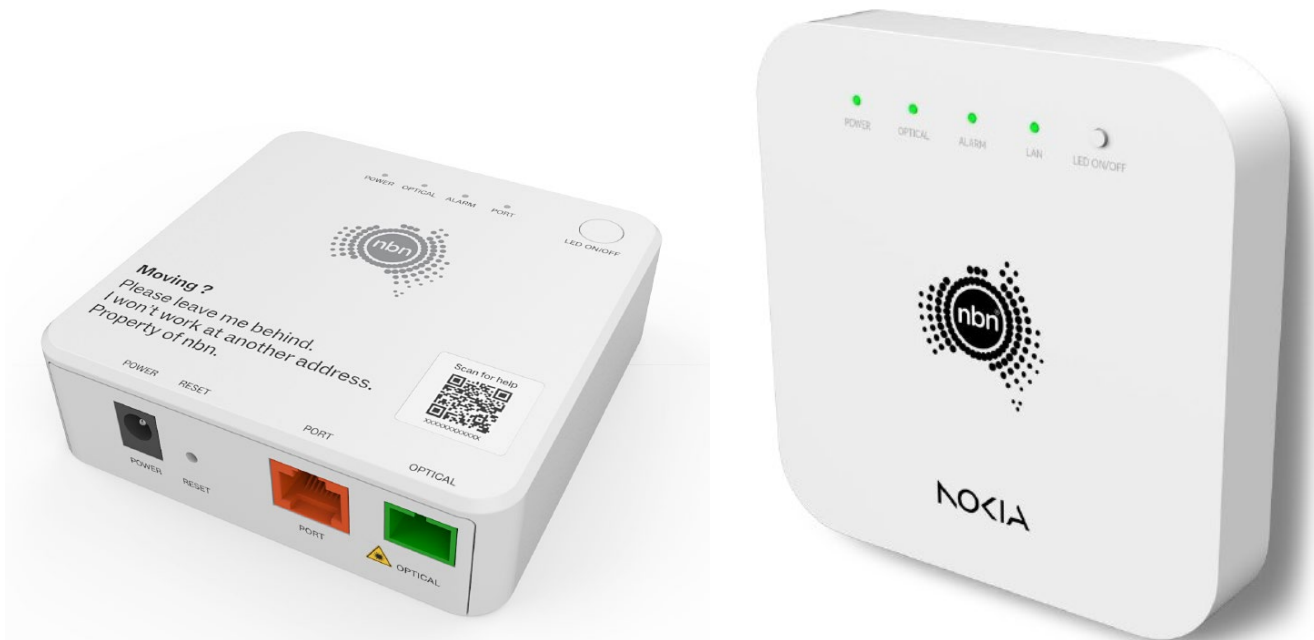


Figure 8. Nokia / Sercomm 1-port GPON NTD



Figure 9. Nokia / Sercomm 4-port GPON NTD



Figure 10. nbn® GPON Ethernet legacy NTD

### 5.1.1 Power requirements

The Nokia and Sercomm 1-port and 4-port NTDs are each supplied with a PSU that plugs directly into a 240V AC GPO and has a 12V DC lead (1.5m in length) and barrel connector for connection to the NTDs. No battery backup option is supplied.

The legacy Nokia GPON NTD is powered by 240V AC PSU only and was supported with a legacy Battery Backup Unit (BBU) consisting of a lead-acid battery. BBU has gone end-of-life and is no longer provided as a build option while the legacy NTD is phased out.

Connection for NTDs is via a standard 240V AC GPO for both wall-mounted and rack-mounted NTDs and can be supplied via a customer supplied UPS.

**nbn™** NTD equipment may be plugged into any power outlet supplied by the end user, providing it meets the requirements of AS/NZS 3000 and applicable safety standards.

If GPO is available, it should be positioned within 1000 mm from the **nbn™** legacy NTD and maximum 1200mm for 1 and 4 Port NT.



Figure 11. Nokia and Sercomm 1 and 4-port NTD 12V DC PSU

## 5.2 Wall mount NTD

The wall mount is the standard installation offering for business nbn® Ethernet connections

The wall mount installation of a 1-port or 4-port NTD is permitted when:

1. it is the customer's preference for installation, or
2. the rack mount solution is not an option.

The NTDs shall be fixed to a suitable wall with the supplied wall mount bracket.

The bracket can manage the incoming PIC fibre, the AC power lead, and customer ethernet cables and is fixed directly to the end user's wall.

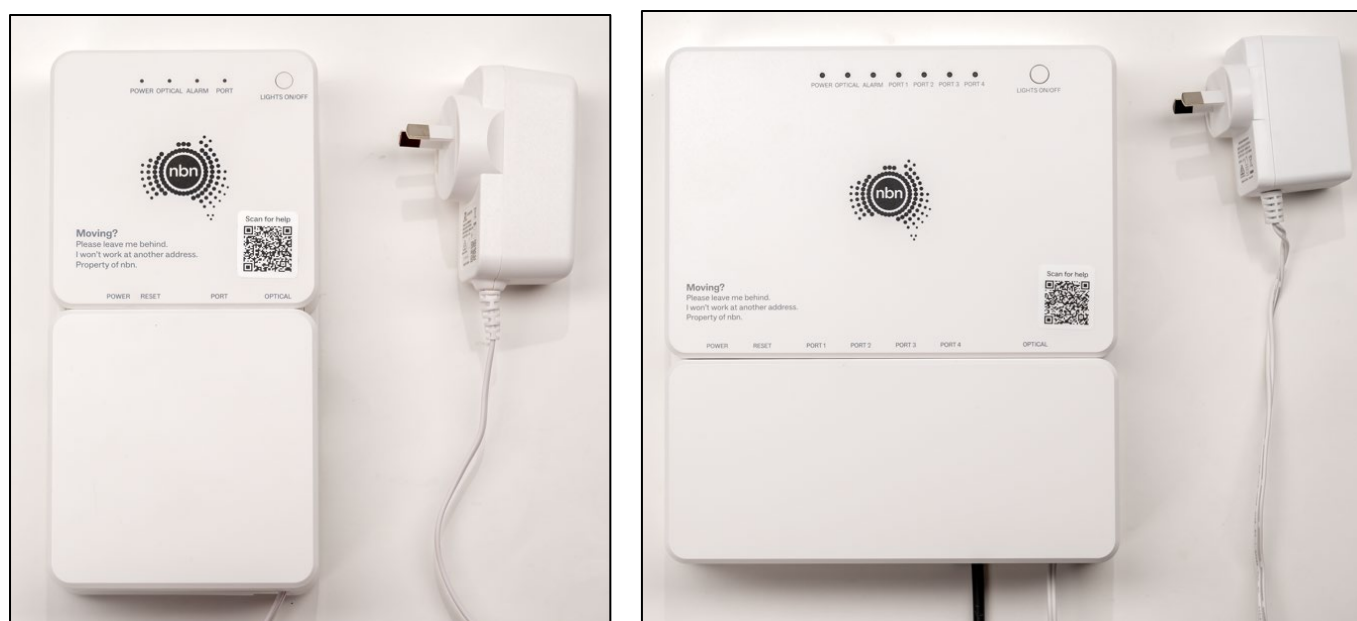


Figure 12. 1 and 4-port NTD arrangements

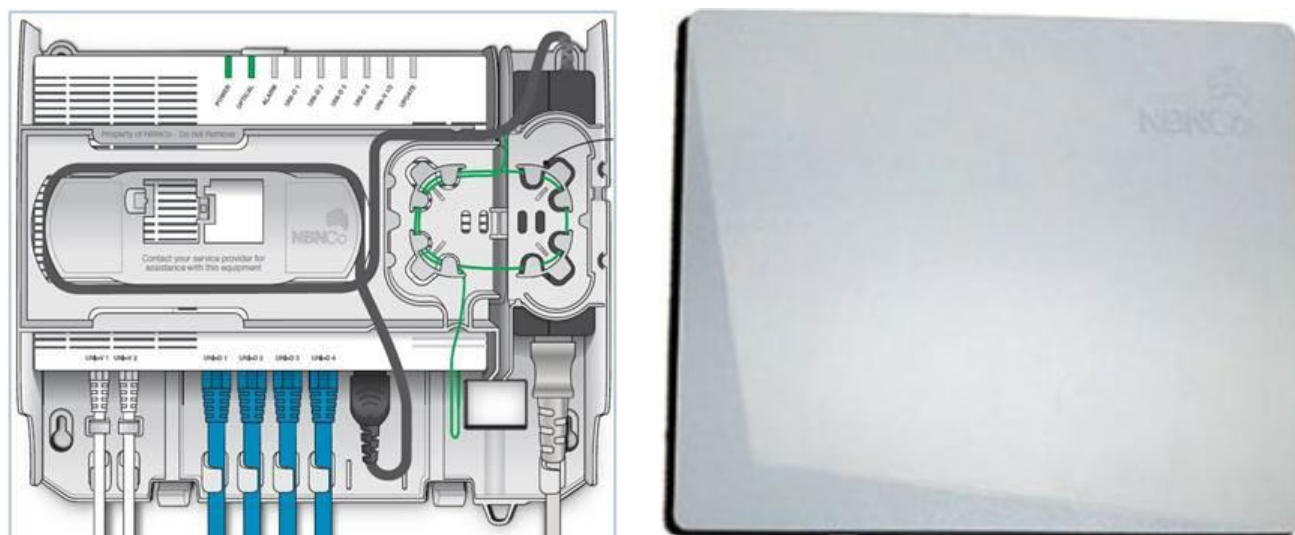


Figure 13. nbn® legacy Ethernet NTD wall mount enclosure



The wall mounted NTDs are fixed to a wall with a wall mount bracket for the Nokia/Sercomm NTDs or the legacy NTDs use with a wall mount enclosure that consists of a mounting frame and cover.

The customer's location for the wall mount NTD must meet the following requirements:

- Internally within the customer's premises.
- An open wall area or a cupboard with suitable air volume of ventilation.
- The wall selected for installation of the equipment needs to be flat and suitably constructed for fixing the enclosure with standard wall fixings.
- Accessible secure / lockable location for installation of nbn® equipment.
- Accessible with a recommended front clearance of 900mm from the NTD.
- AC general power outlet (GPO) within 1200mm of the 1 and 4-port NTDs and 1000mm for legacy NTDs /or BBU.
- Not to be installed at a height greater than 2.4 m from floor to top of device, preferred height below 1.8 m
- 300mm minimum from floor to bottom of device.

### 5.2.1 Prohibited locations

The wall mount NTD shall not be installed in any of the following locations:

- In a boiler, plant or machine room
- In areas of return air supply i.e. areas likely to be contaminated by return air, exhaust air systems and smoke extraction
- In areas subject to extreme or rapid temperature changes or, temperature/humidity likely to cause condensation in equipment rack(s)
- In areas where corrosive or flammable fumes or fluids are used or stored
- In a fire escape stairway
- In a fire control room or anywhere that restricts access to a fire control centre or panel
- In a cupboard containing a fire hose reel
- Wet areas including locations near baths, showers, basins, tubs, fixed water containers, spa pools, spa tubs, swimming pools, fountains, water features or water pumps
- Within a refrigeration room or diesel generator room
- Within an earth potential rise hazard zone
- In an area exposed to outdoor weather conditions or external walls
- In locations where the wall mount is likely to have materials resting against the NTD / PSU
- Within 1.5 m from a heater or air conditioner unit (wall mount)
- Within a defined hazardous area
- In a stairwell
- In a lobby



- In unsecured communal areas
- In hallways or passageways
- Kitchens or lunch areas
- Car parks

### 5.2.2 Clearance requirements

The wall mount has clearance requirement for installation, operation and maintenance of the equipment.

Recommended working clearance from the front of the NTD, of 900mm as a minimum, to ensure sufficient clearance to access the equipment and to be able to stand in front of the enclosure for installation and maintenance without anything in the way.

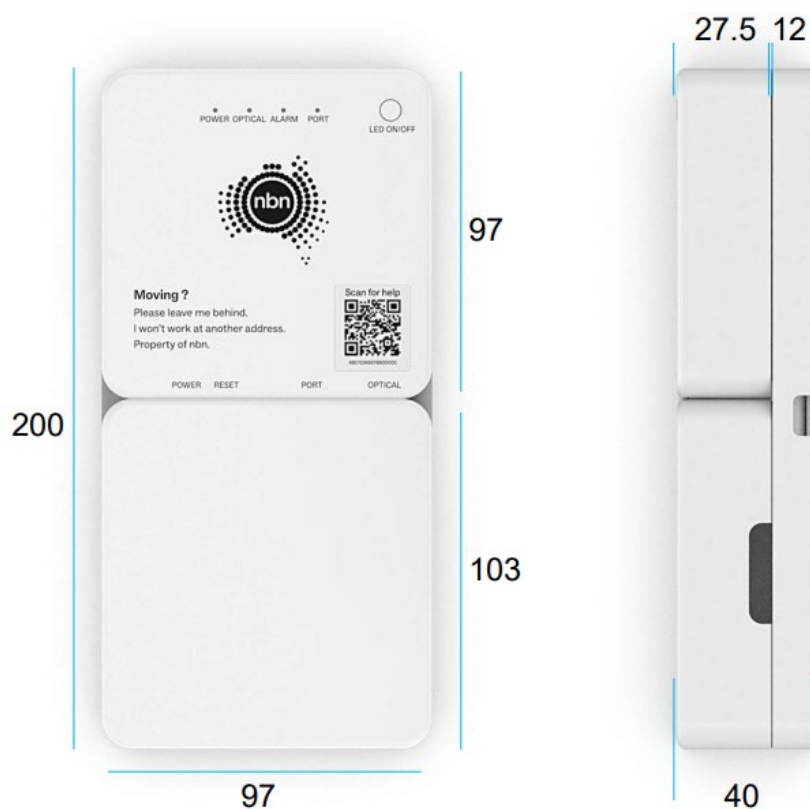
For 1 and 4-port NTDs, if installed within a cupboard or additional enclosure, a minimum clearance from the front of the NTD of 20mm is required when the doors are closed, to ensure adequate ventilation for air circulation.

NTDs shall only be mounted horizontally with LEDs at the top and cable entry at the bottom.

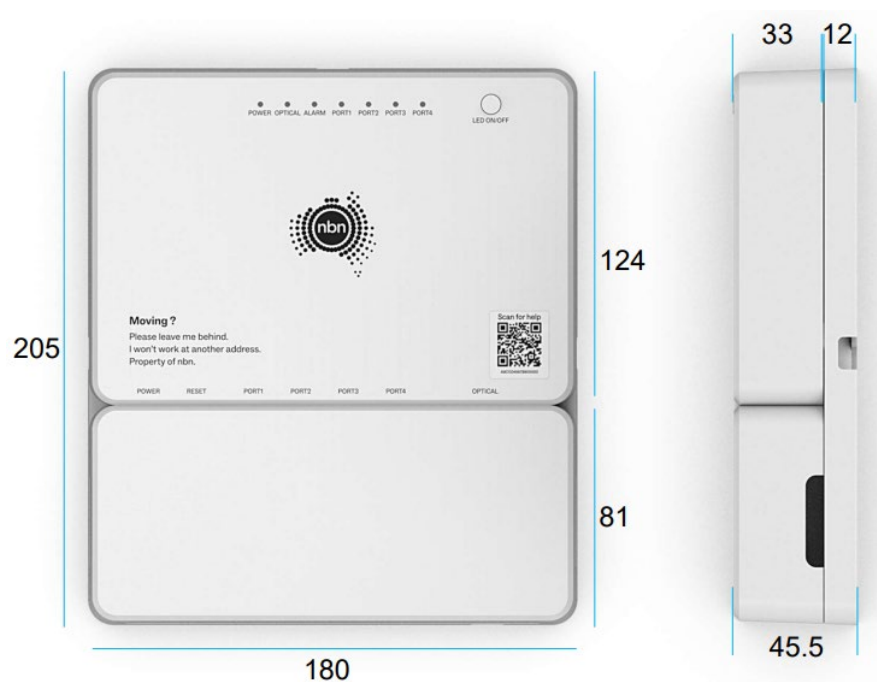


Figure 14. NTD correct and incorrect orientation





**Figure 15. 1-port FTTP NTD and wall Bracket dimensions**



**Figure 16. 4-port FTTP NTD and wall bracket dimensions**

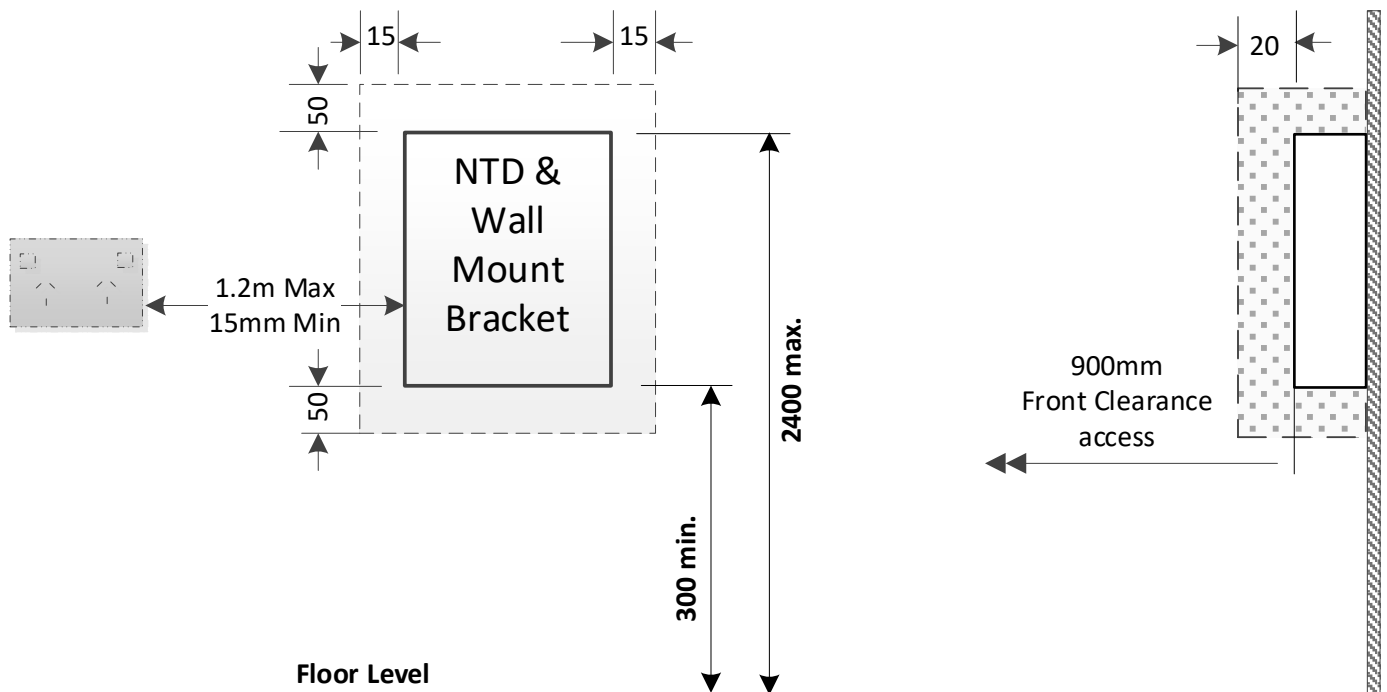


Figure 17. NTD installation clearance requirements

### 5.2.3 Power requirements

Customer shall provide point of connection for AC power.

Power connections should be as per [1] AS/NZ 3000 Electrical Installations (known as the Australian/New Zealand Wiring Rules).

- AC power – Customer to provide a 240V General Power Outlet (GPO) Type 3 pin flat Pin 10A socket.
- The GPO to power the installation is not included within the dimensions of the mounting surface, is shown adjacent in each of the above examples.
- Ensure the GPO is available and/or newly positioned up to 1200mm from the NTD for 1 and 4 ports and 1000mm from legacy equipment template.
- Customer can supply and extension lead/ board if required.

## 5.2.4 Ventilation

If the customer's required location is within a riser cupboard/cabinet or additional enclosure, sufficient openings are required to allow passive ventilation for air circulation.

**Table 1. Ventilation requirements**

Volume of enclosure or cupboard	Required minimum ventilation area (for each of the upper and the lower ventilation region)
20 L (minimum volume requirement)	60 cm <sup>2</sup>
between 20 L and 60 L	60 cm <sup>2</sup> , <i>plus</i> an additional 1.5 square centimetres per litre of volume over 20 L
between 20 L and 60 L	120 cm <sup>2</sup> , <i>plus</i> an additional 0.1 square centimetres per litre of volume over 60 L
greater than 60 L	120 cm <sup>2</sup> , <i>plus</i> an additional 0.1 square centimetres per litre of volume over 60 L

## 5.2.5 Calculating ventilation area for cupboard and additional enclosures

For each ventilation region, use the following steps to calculate the required ventilation area (in square centimetres):

- use the following formula to calculate the volume:

$$volume = \left( \frac{W \times H \times D}{1000} \right)$$

- where:
  - $W$ ,  $H$  and  $D$  are the internal width, height and depth of the enclosure (in centimetres)
  - $volume$  is expressed in litres
- based on the volume calculated in the previous step, determine the required ventilation area (in square centimetres).
  - for volumes between 20 L and 60 L:
$$ventilation\ area = 60 + [(volume - 20) \times 1.5]$$
  - for volumes greater than 60 L:
$$ventilation\ area = 120 + [(volume - 60) \times 0.1]$$

### Example:

An enclosure with internal dimensions of width 38 cm, height 65 cm and depth 13 cm, has the following volume:

$$volume = \left( \frac{38 \times 65 \times 13}{1000} \right) = 32.13\text{ L}$$

As this volume is **between 20 L and 60 L**, we calculate the required ventilation area for each of the upper and lower ventilation areas as:

$$ventilation\ area = 60 + \left[ \left( \frac{38 \times 65 \times 13}{1000} - 20 \right) \times 1.5 \right] = 78.2\text{ cm}^2$$

### 5.2.5.1 Additional ventilation requirements

An open enclosure or cupboard design shall not rely on a cover or doors being opened to meet the thermal ventilation requirements.

Ventilation openings shall not be used for cable ingress/egress at any time.

## 5.3 Rack mount NTDs

Rack mounted NTD installation is permitted when a suitable customer rack is available and is the customer's preference for installation, or the standard wall mount solution is not an option.

The rack mount solution can support 1 or 4-port NTD for installation and legacy NTDs.



Figure 18. 1-port NTD and rack mount

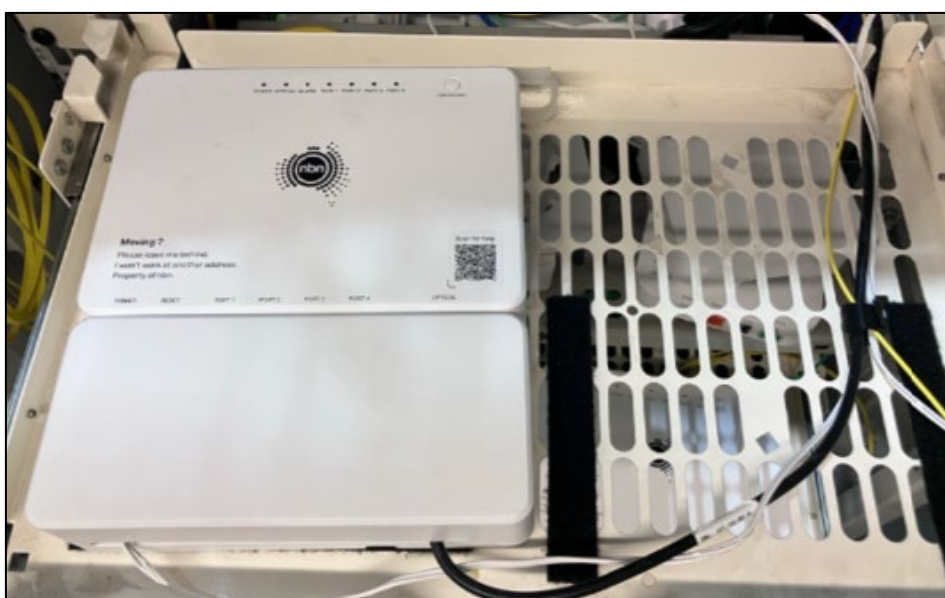
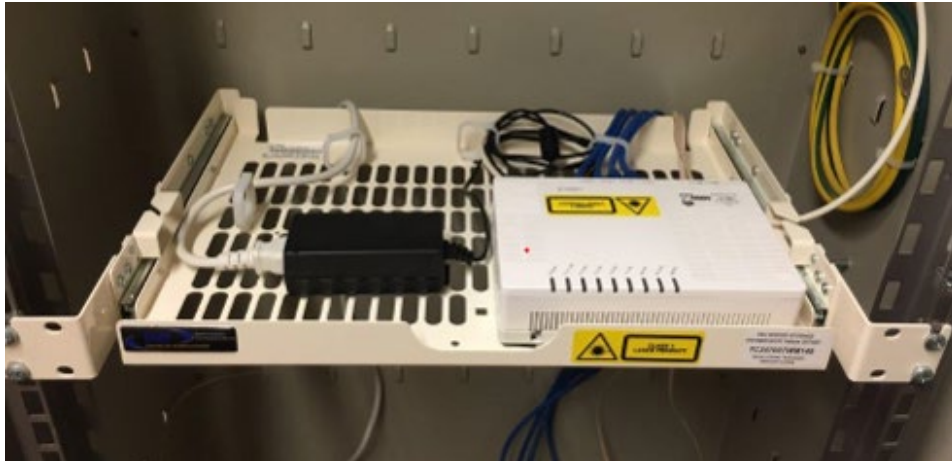


Figure 19. 4-port NTD and rack mount



**Figure 20. nbn® Legacy Ethernet NTD with PSU**

### 5.3.1 Prohibited locations

**nbn** will not be able to use an existing rack located in any of the following locations:

- In a boiler, plant or machine room
- In areas of return air supply i.e. areas likely to be contaminated by return air, exhaust air systems and smoke extraction
- In areas subject to extreme or rapid temperature changes or, temperature/humidity likely to cause condensation in equipment rack(s)
- In areas where corrosive or flammable fumes or fluids are used or stored
- In a fire escape stairway
- In a fire control room or anywhere that restricts access to a fire control centre or panel
- In a cupboard containing a fire hose reel
- Wet areas including locations near baths, showers, basins, tubs, fixed water containers, spa pools, spa tubs, swimming pools, fountains, water features or water pumps
- Within a refrigeration room or diesel generator room
- Within an earth potential rise hazard zone
- In an area exposed to outdoor weather conditions or external walls
- In locations where the wall mount is likely to have materials resting against the BNTD
- Within 0.5 m from a heater or air conditioner unit (wall mount)
- Within a defined hazardous area
- In a stairwell
- In unsecured communal areas
- In hallways or passageways
- Kitchens or lunch areas
- Car parks

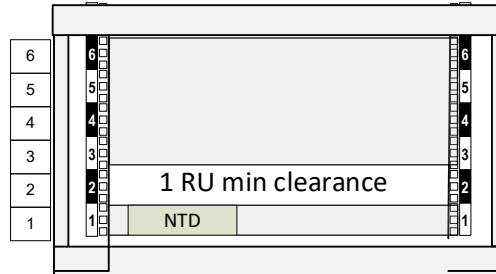


### 5.3.2 Clearance requirements

NTDs need to have clearance to dissipate heat.

This section details the clearance requirements of the 1-port and 4-port NTDs and the legacy NTD.

The 1 and 4 port NTDs require a minimum of 1RU clearance above the NTD and telescopic tray.



**Figure 21. 1 and 4-port NTD variant with 1RU Minimum clearance above**

Each Legacy NTD shelf requires a minimum of 2RU free space above.



**Figure 22. Legacy NTD and PSU variant with 2RU clearance above**

This free space above is a working clearance for access including cable management and enables passive unit cooling.

The Customer rack must meet the following requirements:

- Rack must be 19" or 21" with a minimum depth of 350mm
- Be of good construction with no visible signs of damage
- Accessible secure location for installation of nbn® equipment, with a recommended front clearance of 900mm
- Located with an environment that is suitable for telecommunications and electrical hardware i.e internally with the main building of the customer.
- The rack shall be fixed and can be either floor or wall secured with fixings
- Installed NTDs preferred height is below 1.8 m
- NTD's can be installed up to a height of 2.4 m provided the following controls are met:



- Clear and adequate space for safe installation (including transport, erection and work on a platform / A frame ladder)
- Registering the site with Field Services (PIVIOT) detailing installation is greater than 1.8 m
- NTD or fibre tray shall not to be installed at a height greater than 2.4 m
- The NTD tray is not located at ground level, first RU can be used when not at ground level
- Rack shall be either enclosed with door or NTD tray mounting set back to protect NTD and cabling,
- AC or DC and earth power connections available that comply to AS/NZS 3000

The customer rack shall not be utilised if any of the above are identified, or the rack is located in any of the locations detailed in Section 5.3.2

The 'Rack' will require a 240V AC GPO available to power the NTD.

The rack must have sufficient RU space to support the NTD being installed (refer to Figure 21 and Figure 22).

Current 1-port and 4-port NTDs are supplied with 1.5m 12V DC leads directly attached to the PSU AC plug unit.

Legacy NTDs are supplied with a standard 1200mm power lead. The 3000 mm leads are also available if additional lengths are required.

Earthing and power connections shall be as per AS/NZS 3000

The customer rack shall not be utilised if any of the above are identified or the rack is located in any of the locations detailed in Section 5.3.2 .

### 5.3.3 Power requirements

Customer shall provide point of connection for AC power.

Power connections should be as per AS/NZS 3000:2018 Wiring rules.

AC Power– Customer to provide a 240V AC socket as a General Power Outlet (GPO) with 3 pin, flat Pin 10A socket as either a:

- Wall mounted socket or
- as part of a rack mounted PDU (Power Distribution Unit)

Rack mounted power can also be supplied via an AC PDU with GPO Sockets (10A 3 conductor pin) , if IEC sockets are existing a customer supplied IEC to 3 pin mains adaptor is required.

Sockets shall be located within 1000mm of the legacy NTD and 1200mm for 1 and 4 port NTDs.

### 5.3.4 Ventilation

Customer must have passive ventilation to allow air circulation.

If the customer's required location is within a cupboard/cabinet or additional enclosure, sufficient openings are required to allow passive ventilation for air circulation Refer to 5.3.4 Ventilation, for passive ventilation requirement.

## 6 Passive fibre cable equipment

nbn® passive fibre products are required to be installed within the Customer's Premises, the products below include the common products (but are not limited to) for connection of a business nbn® service.

A Building Fibre Device (BFD) is utilised to connect nbn® external network to the building.

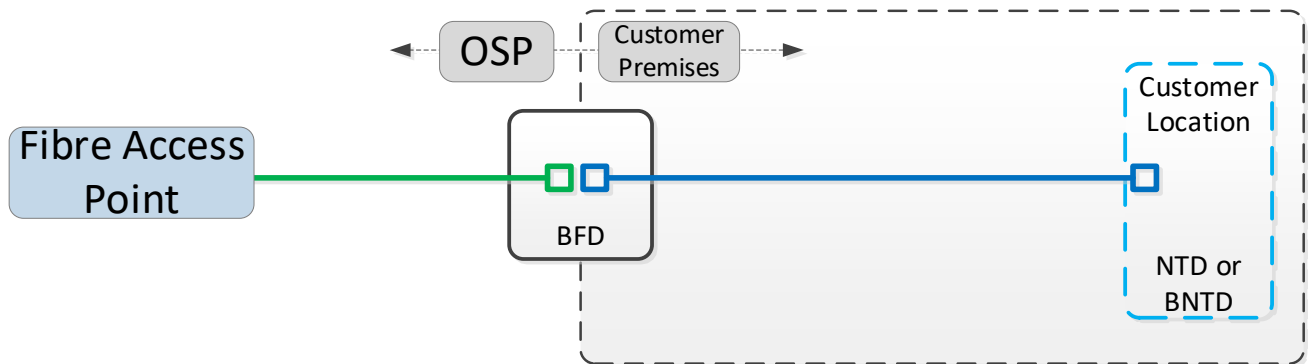


Figure 23. Typical single business nbn® connection schematic

### 6.1 Building Fibre Devices

#### 6.1.1 Premises Connection Device (PCD)

nbn may use a Premises Connection Device (PCD) to connect the Fibre cables from the street to the customer's premises. This is used to transition from an external street cable to a Premises Internal Cable (PIC). The PCD is shown in Figure 24. It is wall mounted and can be located internally or externally.



Figure 24. nbn PCD

The location for the wall mount PCD must meet the following requirements:

- External / Internal wall at the customer's premises.
- Mounted close to the lead-in cable enters the premises or leaves pit and pipe infrastructure.
- A flat and suitably constructed wall for fixing the enclosure with standard wall fixings.

- Accessible with a recommended front clearance of 900mm from the PCD.
- Not installed greater than 1.8 m to top of PCD from floor level.
- Minimum 300mm from ground level.
- 255m clear access on Left Hand Side (LHS) to allow door to open fully.

### 6.1.2 Prohibited locations

The PCD shall not be installed in any of the following locations:

- In a boiler, plant or machine room
- In areas of return air supply i.e. areas likely to be contaminated by return air, exhaust air systems and smoke extraction
- In areas subject to extreme or rapid temperature changes or, temperature/humidity likely to cause condensation in equipment rack(s)
- In areas where corrosive or flammable fumes or fluids are used or stored
- In a fire escape stairway
- In a fire control room or anywhere that restricts access to a fire control centre or panel
- In a cupboard containing a fire hose reel
- Wet areas including locations near baths, showers, basins, tubs, fixed water containers, spa pools, spa tubs, swimming pools, fountains, water features or water pumps
- Within a refrigeration room or diesel generator room
- Within an earth potential rise hazard zone
- Within 0.5 m from a heater or air conditioner unit (wall mount)
- Within a defined hazardous area
- In a stairwell
- In a lobby
- In hallways or passageways
- Kitchen or lunch areas

### 6.1.3 Clearances

PCD needs 100mm clearance on all sides apart from the left-hand side (LHS) that requires 255mm to allow the door to open fully.

To allow ease of installation and **nbn®** Technicians to have sufficient access to be able to install and maintain the **nbn®** equipment, 900mm is recommended from front of PCD.

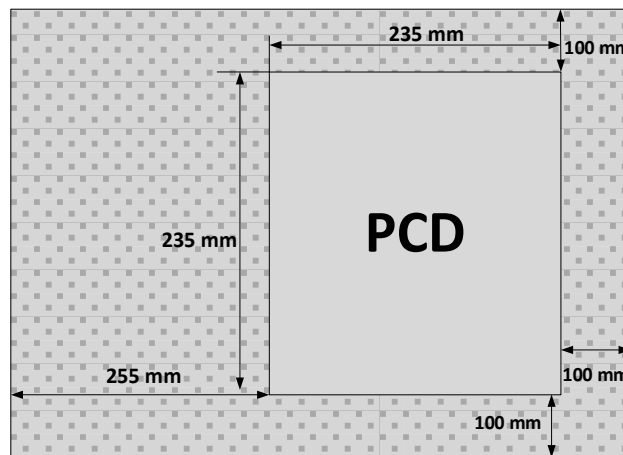


Figure 25. Premise Connection Device (PCD) clearances

### 6.1.4 BUDI-S and BUDI-M

The BUDI acts like the PCD for facilitating the transition from external to multiple internal cables to the Customer's required locations.

It may also be used conjunction with a Fibre Distribution Terminal (FDT) or Splitter Terminal Distribution (SDT) to allow ease of cable installation.

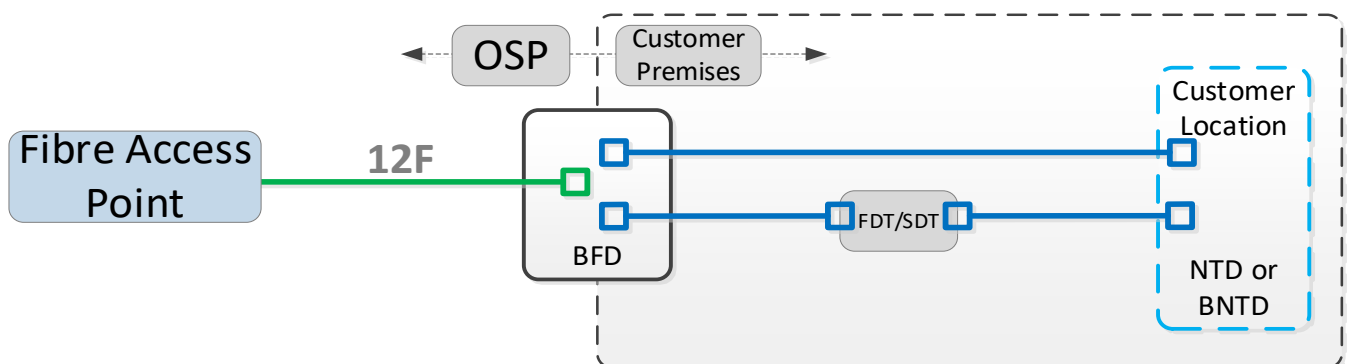


Figure 26. Typical BUDI business nbn® connection schematic

The location for the BUDI shall meet the following requirements:

- At the Customer's premises with preference for a communications rooms or Communications riser
- A flat and suitably constructed wall for fixing the enclosure with standard wall fixings

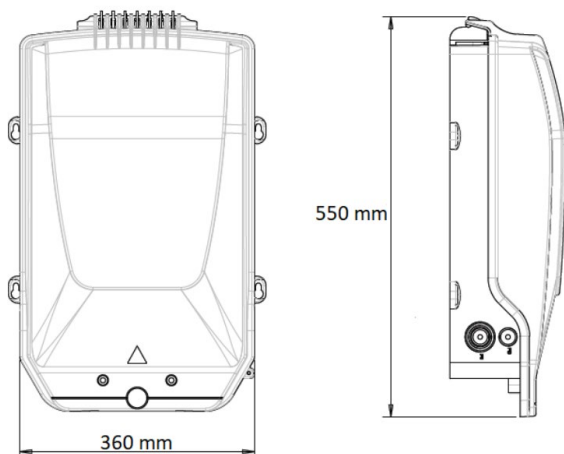
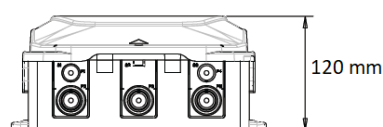
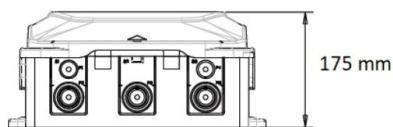
- Preferably mounted close to the lead-in cable, enters the premises or leaves pit and pipe infrastructure
- Accessible with a recommended front clearance of 900mm from the BUDI
- Not installed greater than 1.8 m to the top of the BUDI from floor level
- Minimum 400mm from ground level.

#### **6.1.4.1 Prohibited locations**

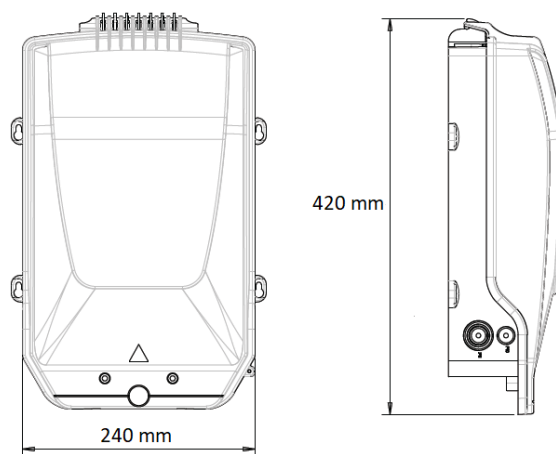
The BUDI shall not be installed in any of the following locations:

- In a boiler, plant or machine room
- In areas of return air supply i.e. areas likely to be contaminated by return air, exhaust air systems and smoke extraction
- In areas subject to extreme or rapid temperature changes or, temperature/humidity likely to cause condensation in equipment rack(s)
- In areas where corrosive or flammable fumes or fluids are used or stored
- In a fire escape stairway
- In a fire control room or anywhere that restricts access to a fire control centre or panel
- In a cupboard containing a fire hose reel
- Wet areas including locations near baths, showers, basins, tubs, fixed water containers, spa pools, spa tubs, swimming pools, fountains, water features or water pumps
- Within a refrigeration room or diesel generator room
- Within an earth potential rise hazard zone
- Within 0.5 m from a heater or air conditioner unit (wall mount)
- Within a defined hazardous area
- In a stairwell
- In a lobby
- In hallways or passageways
- Kitchen or lunch areas

#### 6.1.4.2 Dimensions and clearance requirements



**Figure 27. nbn BUDI - M**



**Figure 28. nbn BUDI - S**

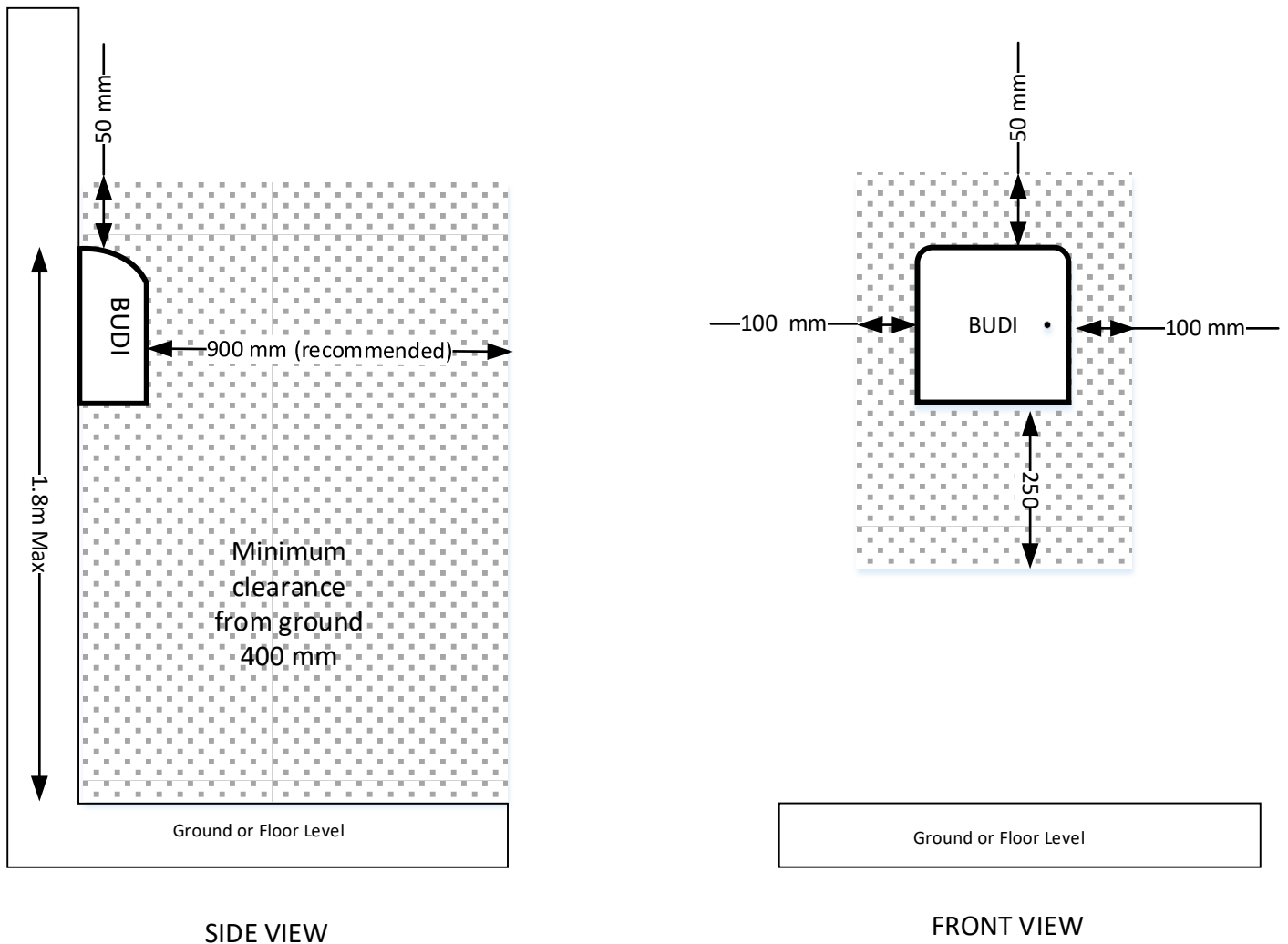
The BUDI-M or S requires 100mm side clearance for door opening and access to open.

900mm clearance is a recommended front clearance for ease of maintenance and installation.

This can be reduced if access to the device is not impeded and access for installation and maintenance is sufficient to maintain and operate.

250mm clearance is required directly below the BUDI to allow for cable installation.

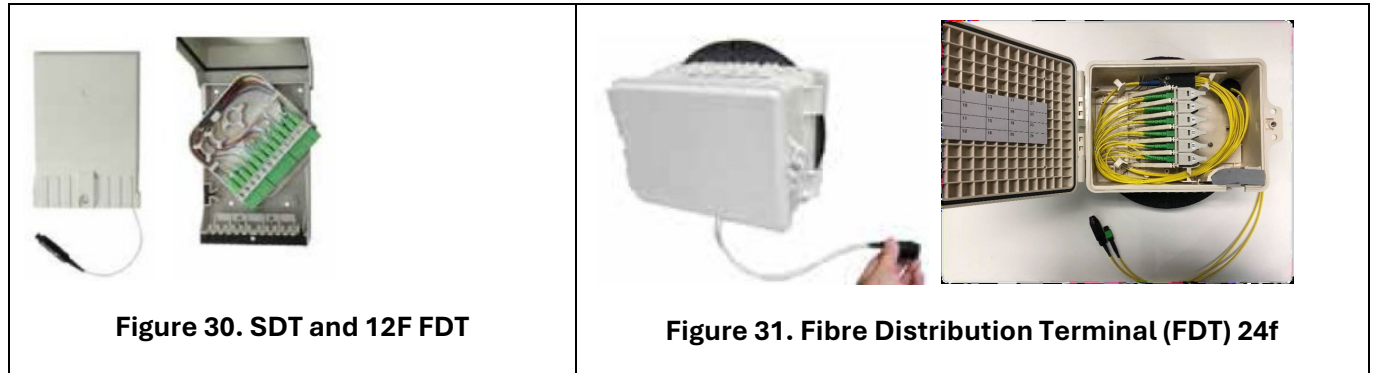
The BUDI is to be installed at an ergonomic height; this should be aimed for where practicable. The minimum height from the ground shall be no less than 400mm.



**Figure 29. BUDI clearances**

## 6.2 Fibre Distribution Terminal (FDT) and Splitter Distribution Terminal (SDT)

The SDTs and FDTs are used to aggregate fibres to a central location within the customer's building, normally located within a riser or communications cupboard with access to cable pathways.



The location for the SDT /FDT must meet the following requirements:

- Internal wall at the customer's premises with preference for a communications rooms or communications riser.
- A flat and suitably constructed wall for fixing the enclosure with standard wall fixings.
- Preferably mounted close to cable pathways.
- Accessible with a recommended front clearance of 900mm from the FDT.
- Not installed greater than 1.8 m to top of FDT from floor level.
- Minimum 400mm from ground level.

### 6.2.1 Prohibited locations

The SDT/FDT shall not installed in any of the following locations:

- In a boiler, plant or machine room
- In areas of return air supply i.e. areas likely to be contaminated by return air, exhaust air systems and smoke extraction
- In areas subject to extreme or rapid temperature changes or, temperature/humidity likely to cause condensation in equipment rack(s)
- In areas where corrosive or flammable fumes or fluids are used or stored
- In a fire escape stairway
- In a fire control room or anywhere that restricts access to a fire control centre or panel
- In a cupboard containing a fire hose reel
- Wet areas including locations near baths, showers, basins, tubs, fixed water containers, spa pools, spa tubs, swimming pools, fountains, water features or water pumps
- Within a refrigeration room or diesel generator room



- Within an earth potential rise hazard zone
- Within 0.5 m from a heater or air conditioner unit (wall mount)
- Within a defined hazardous area
- In a stairwell
- In a lobby
- In hallways or passageways
- Kitchens or lunch areas
- Externally

### 6.2.2 Dimensions and clearance requirements

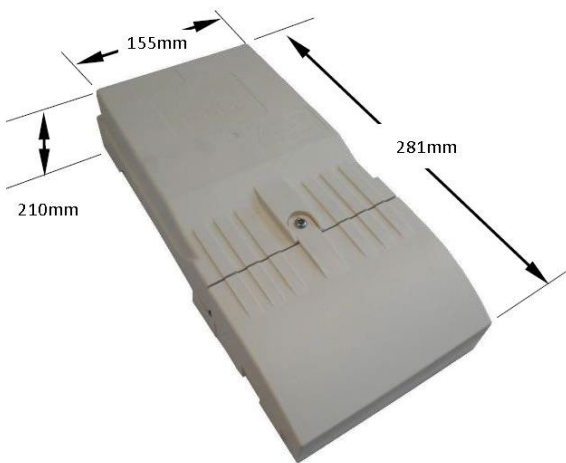


Figure 32. 12f FDT /SDT Dimensions

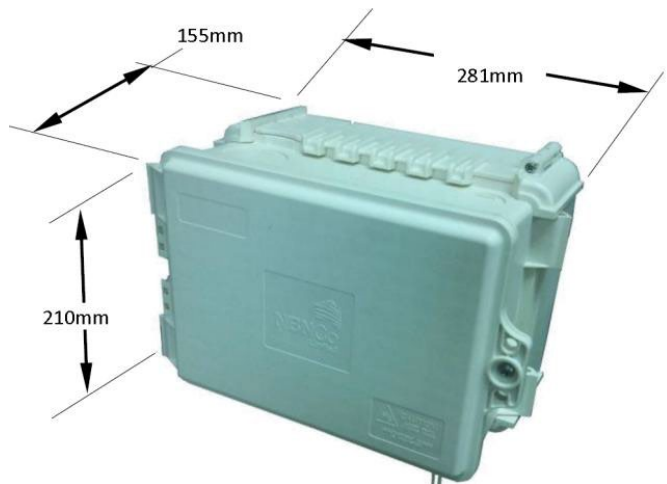
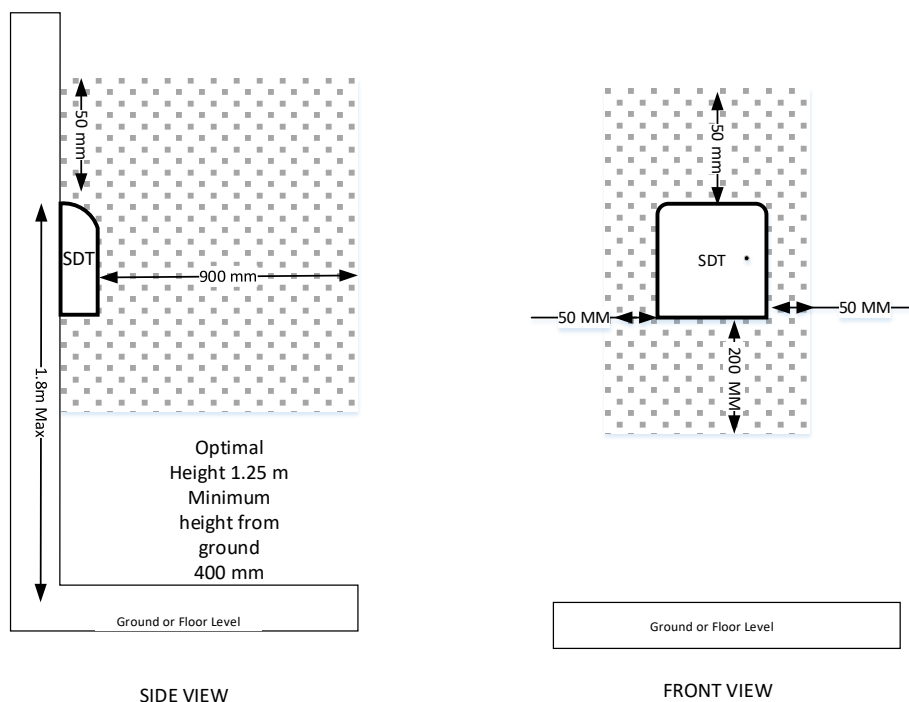


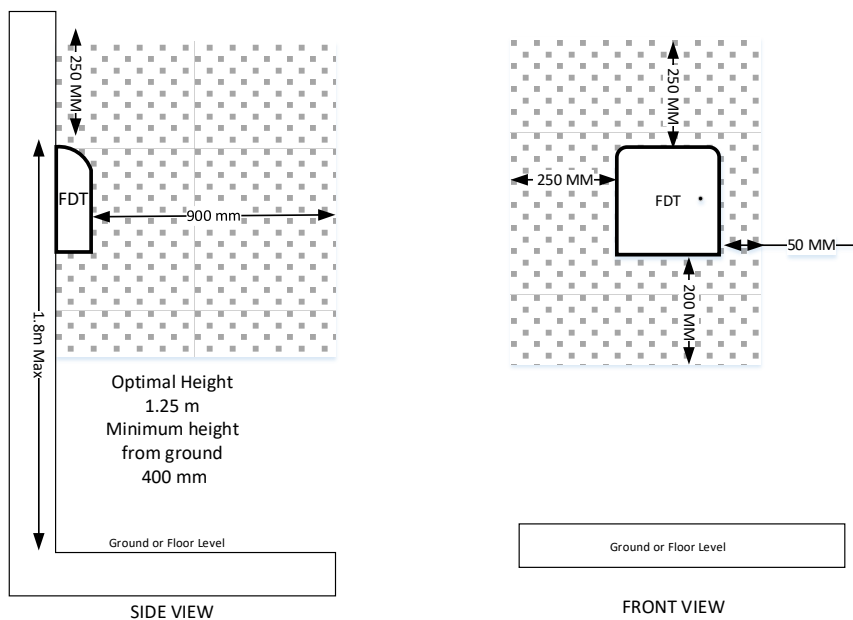
Figure 33. 24f FDTs Dimensions

The SDTs/FDTs have a 900 mm recommended front clearance, 900 mm is to allow a **nbn®** personnel to have adequate spatial requirements for accessing and maintaining the device, the 900 mm can be achieved by the opening of doors or partitions when placed in cupboards or risers.

The optimal height is 1.25 m from the ground, and ideally the SDT/FDT should be as close to this height as possible, it can go to maximum height of 1.8 m to the top of the FDT, and a minimum height of 400 mm from the floor can be allowed when the optimal height cannot be met.



**Figure 34. SDT clearances**



**Figure 35. Fibre Distribution Terminal (FDT) clearances**

## 6.3 nbn® equipment separation from other services

The following sections detail the clearances that shall be maintained for the safety and practicality of installing nbn® Equipment within premises in relation to other services. This is in addition to any of the clearances detailed previously in this document.

### 6.3.1 Gas meter clearances

The clearance for a gas meter is dependent on whether the gas meter is located within an enclosure or outside of an enclosure. A minimum clearance of 500mm is required from an approved gas meter enclosure.

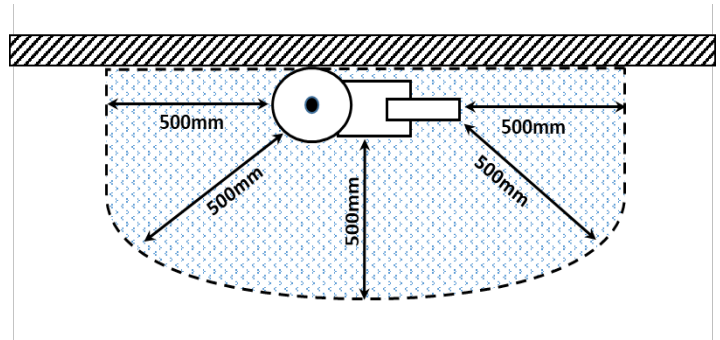
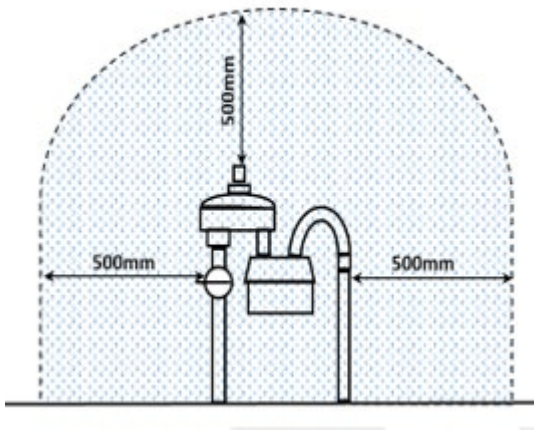


Figure 36. Gas meter exclusion zone without an enclosure

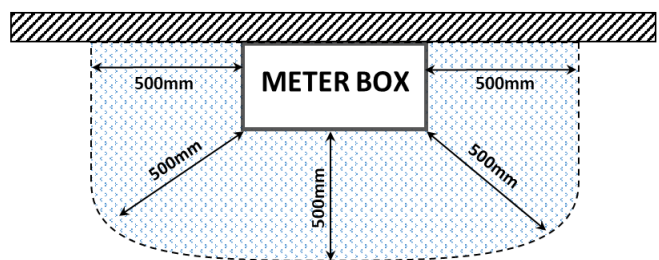
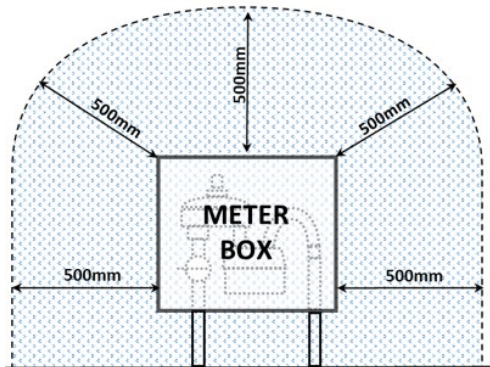
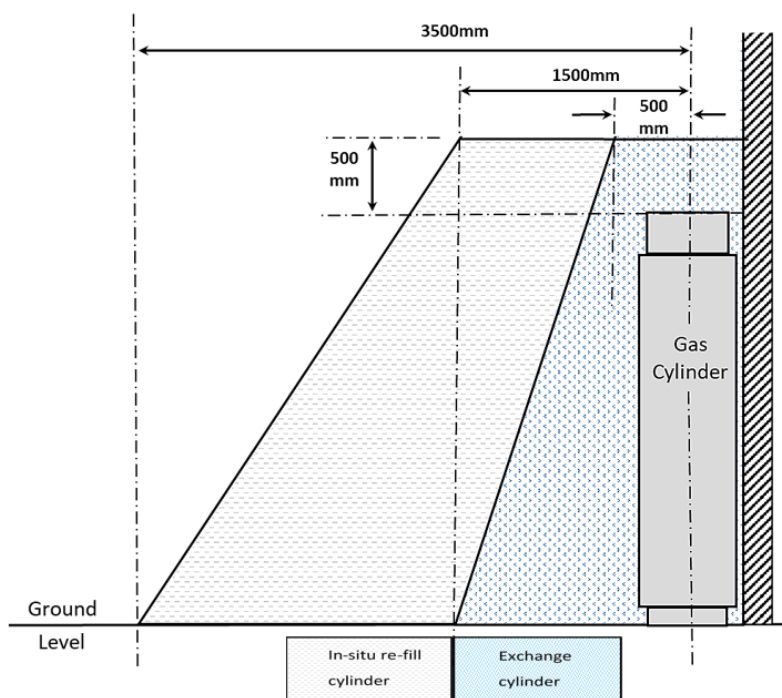


Figure 37. Gas meter front exclusion zone with an enclosure

The distances measured from the surface of the gas meter, gas regulator or any gas fitting, whichever is the outermost.

### 6.3.2 Gas cylinder clearances

The following clearances apply to an in-situ gas cylinder or an exchangeable gas bottle.



**Figure 38. Gas cylinder clearances**

The horizontal distances are measured from the centre line of the gas cylinder or bottle.

The vertical distances are measured from the top of any gas cylinder/bottle valve.

### 6.3.3 Other utility and obstruction clearances

The table below details the clearances for other utilities and obstructions.

Please refer to AS/NZS 3000:2018 Wiring rules<sup>1</sup> for clearances from electrical switch equipment.

**Table 2. Equipment clearances**

Obstruction/utility	Clearance
Fixed services: pipes, taps, water meters	150mm
Power source: including the point where the premise power supply cable connects to the property electrical switchboard	150mm
Working clearance from switchboard – As per AS/NZS 3000:2018	600mm for SDU / 1000mm for MDU
Corner of the wall and exterior structure, such as a window or balcony	100mm
Left of the Premise Connection Device (PCD) to allow for the door to open	255mm
Space under the eaves from an aerially fed PCD	100mm

---

<sup>1</sup> Customer – Check with an electrician for a copy of this document.

## 7 Glossary

Unless otherwise defined in this section 6 or elsewhere in this document, capitalised terms used in this document have the meanings given in the Wholesale Broadband Agreement as published on **nbn**'s website (WBA).

Term	Description
AC	Alternating Current
ACMA	Australian Communications and Media Authority – an Australian Government statutory authority within the Communications portfolio.
BBU	Battery Back-up Unit
BCA	Building Code of Australia  The National Construction Code (NCC) provides the minimum necessary requirements for safety, health, amenity and sustainability in the design and construction of new buildings (and new building work in existing buildings) throughout Australia.
BFD	Building Fibre Device
BNTD	Business Network Terminal Device – also referred to as <b>nbn</b> ® Connection Box
CET	Communications Earth Terminal
CTL	Cable Transition Location (device)
Customer	An authorised representative of the business that occupies the Premises to be supplied with <b>nbn</b> ® Ethernet or <b>nbn</b> ® Enterprise Ethernet and otherwise has the meaning given in the WBA.
DP	Delivery Partner
Ethernet	A common method of networking computers in a local area network (LAN) using a variety of forms of cabling. Ethernet supports retail service provider (RSP) service differentiation as a result of a ubiquitous interface. It facilitates competition and choice as is able to support multiple services and RSPs on the same physical interface, when necessary. It offers flexibility and substantial bandwidth. It supports security and grades of QoS.
FAP	Fibre Access Point
FDT	Fibre Distribution Terminal

Term	Description
FTTP	<p>Fibre to the Premises</p> <p>An <b>nbn</b>® Fibre to the premises connection (FTTP) is used in circumstances where an optic fibre line will be run from the nearest available fibre node, to Customer premises. FTTP also requires an <b>nbn</b>® network device to be installed inside the Customer's premises.</p>
FWO	Fibre Wall Outlet
Gbps	Gigabits per second
GPO	General Power Outlet
GPON	<p>Gigabit Passive Optical Network</p> <p>An optical-access system based on Internet Protocol (IP) that lets multiple homes or businesses in a neighbourhood share fibre from a service provider's central office.</p>
HS&E	Health, Safety & Environment
LHS	Left Hand Side
LIC	Lead-In Conduit
<b>nbn</b> ® network	National Broadband Network
NBP	Network Boundary Point
NTD	Network Termination Device (also referred to as an <b>nbn</b> ® connection box)
NTD legacy enclosure	Optional wall-mounted, purpose-built housing for an NTD, PS/S and cabling. Consists of a base and a removable cover. (Also referred to as an <b>nbn</b> ® connection box cover.)
PCD	Premises Connection Device
PSB	Power Supply Battery
PSU	Power Supply Unit
QoS	<p>Quality of Service</p> <p>QoS refers to a wide range of networking technologies and techniques. The goal of QoS is to provide guarantees on the ability of a network to deliver predictable results. Network performance within the scope of QoS can include availability, bandwidth, latency and error rate.</p>
SDT	Splitter Distribution Device

Term	Description
UPS	Uninterruptible Power Supply