DS-6250 U1 DMR Trunking Base Station User Guide

Document Version: V1.0

Release Date: July 2017

Copyright Information

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Contents

Documentation Information

This section describes conventions, and revision history of this document.

Audience

This document is intended to be read by:

- Technical support engineers
- Maintenance engineers
- Installation and commissioning engineers
- Enterprise users

Documentation Conventions

Icon Conventions

Icon	Description
Tip	Indicates information that can help you make better use of your product.
Note	Indicates references that can further describe the related topics.
Caution	Indicates situations that could cause data loss or equipment damage.
Warning	Indicates situations that could cause minor personal injury.
Danger	Indicates situations that could cause major personal injury or even death.

Notation Conventions

Item	Description
“ ”	The quotation marks enclose the name of a software interface element. For example, click “OK”.
Bold	The text in boldface denotes the name of a hardware button. For example, press the **PTT** key.
->	The symbol directs you to access a multi-level menu. For example, to select “New” from the “File” menu, we will describe it as follows: “File -> New”.

Revision History

Document Version	Product Version	Release Date	Description
00	V1.0	August 2017	Release date.

FCC Warning

Any Changes or modifications not expressly approved by the party responsible for compliance could void the user's authority to operate the equipment.

This device complies with part 15 of the FCC Rules. Operation is subject to the following two conditions: (1) This device may not cause harmful interference, and (2) this device must accept any interference received, including interference that may cause undesired operation.

FCC Radiation Exposure Statement:

This equipment complies with FCC radiation exposure limits set forth for an controlled environment. This equipment should be installed and operated with minimum distance 140cm between the radiator& your body.

This transmitter must not be co-located or operating in conjunction with any other antenna or transmitter.

Note: 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 the dealer or an experienced radio/TV technician for help.

ISEDC RSS warning

This device complies with Innovation, Science and Economic Development Canada Compliance licence-exempt RSS standard (s). Operation is subject to the following two conditions: (1) this device may not cause interference, and (2) this device must accept any interference,including interference that may cause undesired operation of the device.

Le présent appareil est conforme aux CNR d'Innovation, Sciences et Développement économique Canada

applicables aux appareils radio exempts de licence.

L'exploitation est autorisée aux deux conditions suivantes:

(1) l'appareil ne doit pas produire de brouillage, et

(2) l'utilisateur de l'appareil doit accepter tout brouillage radioélectrique subi, même si le brouillage est susceptible d'en compromettre le fonctionnement.

ISEDC Radiation Exposure Statement:

This equipment complies with ISEDC RF radiation exposure limits set forth for an controlled environment. This transmitter must not be co-located or operating in conjunction with any other antenna or transmitter.

This equipment should be installed and operated with minimum distance 140cm between the radiator & your body.

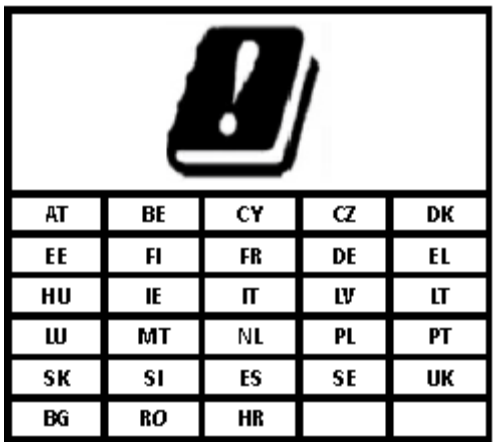
IC exposition aux radiations:

Cet équipement est conforme avec ISEDC les limites d'exposition aux rayonnements définies pour contrôlé environnement.

Cet émetteur ne doit pas être co-localisés ou fonctionner en conjonction avec une autre antenne ou émetteur.

Cet équipement doit être installé et utilisé avec un minimum de 140cm de distance entre le radiateur et votre corps.

Restrict use warning:



AT	BE	CY	CZ	DK
EE	FI	FR	DE	EL
HU	IE	IT	LV	LT
LU	MT	NL	PL	PT
SK	SI	ES	SE	UK
BG	RO	HR		

1. Introduction

Integrated base station (iBS) is a new generation of base station supporting both narrow-band and wide-band communications. It integrates multiple functionalities performed by separate hardware units such as CHU, BSCU, DPU, and IRU into one hardware unit. iBS delivers stable signal coverage for a certain area and ensures smooth and continuous communication. It is suitable for users from public sector such as police, firemen, as well as commercial users.

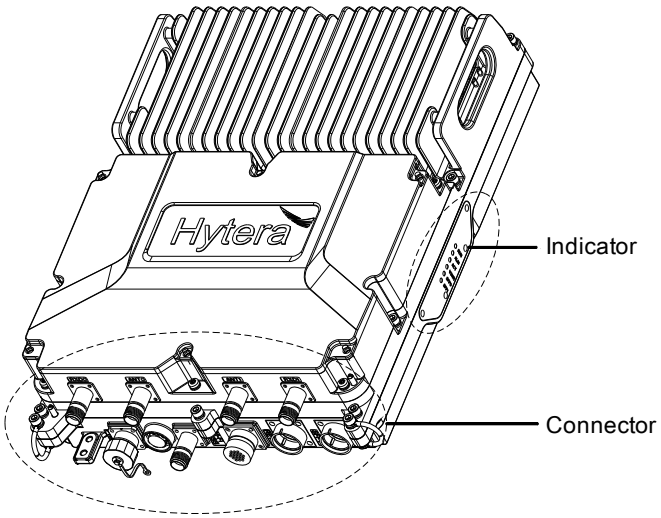
Highlights

- Small footprint, low power consumption, and excellent mobility.
- Fan-less design achieved by high-grade heat conductive materials.
- Easy installation, low construction and maintenance cost.
- Multi-carrier technology and SDR technology, supports up to eight carriers.

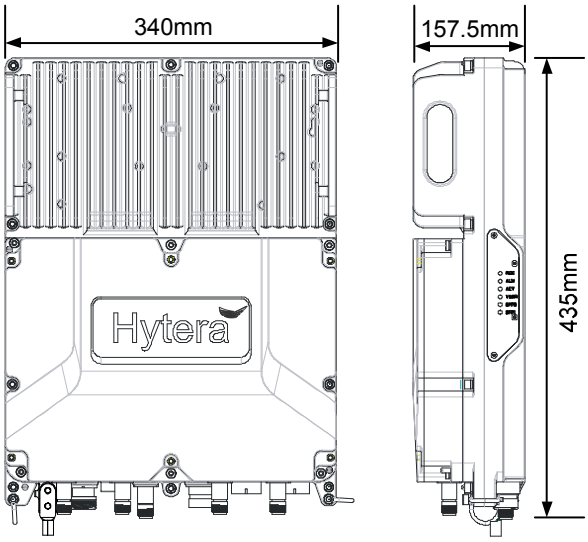
2. Getting Started

2.1 Appearance

The figure below shows the overall appearance of iBS.

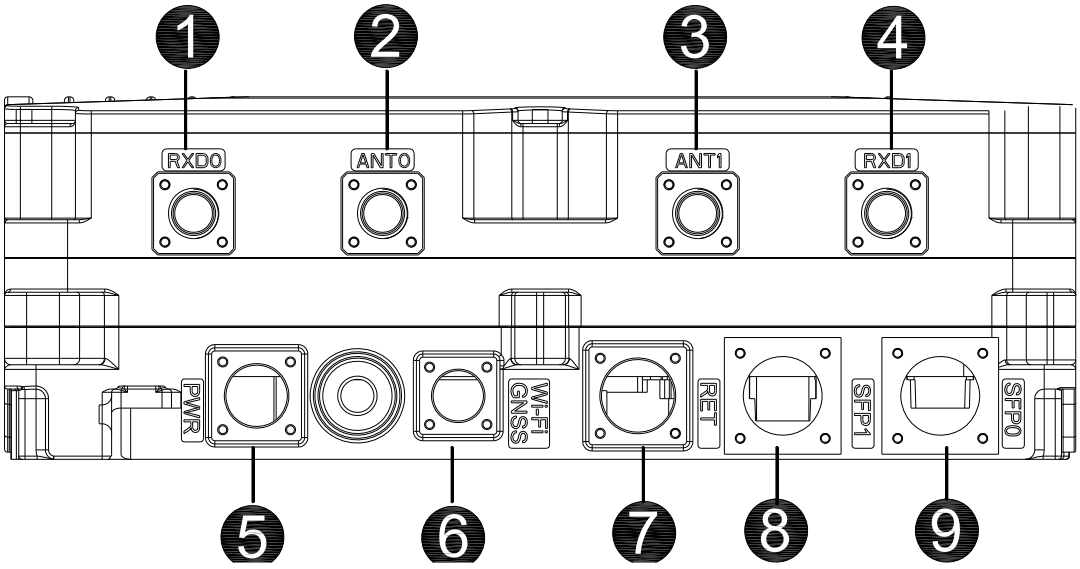


The figure below shows dimensions of iBS.



2.2 Connectors and Interfaces

The figure below shows connectors and interfaces located on the bottom of the iBS.



No.	Mark	Name	Specification	Description
1	RXD0	Antenna diversity reception connector 0	N-F	Connected to diversity reception antenna for receiving diversity RF signals.
2	ANT0	Antenna connector 0	N-F	Connected to antenna for transmitting and receiving RF signals.
3	ANT1	Antenna connector 1		
4	RXD1	Antenna diversity reception conenctor 1	N-F	Connected to diversity reception antenna for receiving diversity RF signals.
5	PWR	Power supply	/	Connected to external power supply.
6	WI-FI/GNSS	GNSS antenna connector	N-F (GNSS)	Connected to GNSS antenna.
7	RET	External monitoring interface	DB8	Connected to external monitoring device, supports dry contact signal input X 3 and RS422 signal input X 1.

No.	Mark	Name	Specification	Description
8	SFP1	Transmission interface 1	SFP/SFP-F	Connected to external transmission network. ● Connected to optical-electric conversion module, supports Gigabit Ethernet. ● Supports SFP module. ● Supports single-mode optical fiber (communication distance≤10km) and multi-mode optical fiber (communication distance≤200km).
9	SFP0	Transmission interface 0		

3. Installation

3.1 Safety Information

Before performing any operation, read the following precautions and operation instructions carefully to ward off potential risks.

Local Laws and Regulations

When operating a device, comply with the local safety laws and regulations.

Power Supply

Danger

- Direct contact or indirect contact (through moist objects) with the high voltage or mains electricity may result in fatal danger.
- Non-standard and incorrect operations on the high-voltage power supply may result in fire and electric shock.

- Never wear conductive articles such as watches, bracelets or rings during operation.
- Do use dedicated tools during high voltage or AC operations.
- Take necessary measures to prevent entry of moisture into the equipment operating under a moist environment.
- Make sure the lightning-proof grounding is implemented for the equipment to prevent it from being damaged by lightning strikes.
- Disconnect the equipment from the power supply before installing or uninstalling it.
- Check the label on the cable to ensure correct connection.
- Make sure that the equipment is well grounded before powering it on.
- Disconnect the equipment from the power supply if you find water or other liquids in the equipment.
- Make sure the power switch is toggled to the “Off” position before installing the equipment.

Working at Heights

Work performed 2 m (6.56 ft.) above the ground is regarded as work at heights. Work at heights, comply with related local regulations.

- Stop such work in any of the following conditions: adverse weather, wet steel tubes, and other risky situations.
- Set danger signs and prevent unauthorized person from entering the work area.
- Avoid stacking scaffolds and other materials, and staying or passing below the aerial work platform.

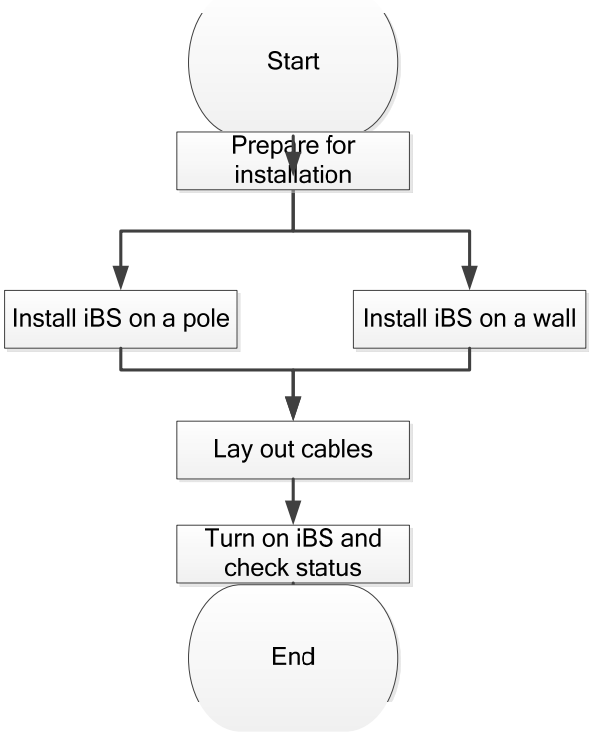
- Avoid dropping machinery and tools that may cause injury.
- Take sound safety actions such as wearing the hamlet and safety belt properly.
- Do wear heat-retaining clothes when working in cold areas.
- Make sure that the ladder is safe for use, and overload is strictly prohibited.
- The slant of the ladder is suggested to be 75°. When using a ladder, place it on a stable ground, and take protective measures on the base part of the ladder for skid resistance.
- Handle and use all instruments and tools with care to avoid falling.
- Do not play or sleep on the aerial work platform.

Personnel

Installation and maintenance personnel must be trained to perform operations correctly and safely.

3.2 Installation Flow

The figure below shows the flow of installing iBS.



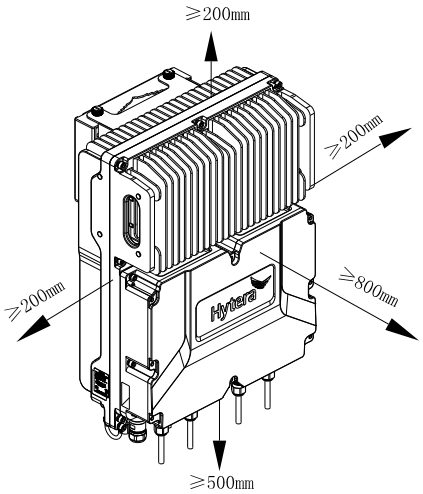
3.3 Installation Requirements

3.3.1 Site Requirements

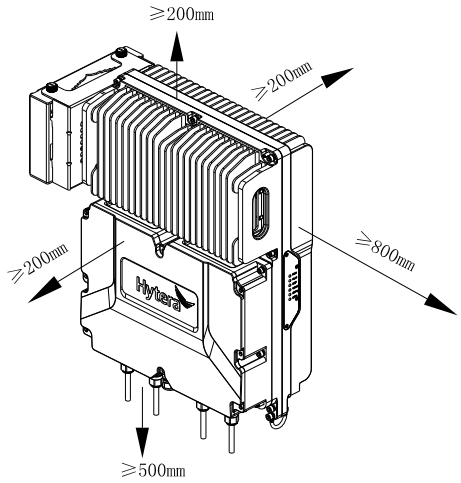
Space Requirements

- It is recommended that the space of at least 200 mm be left between the product top and the ceiling.

- It is recommended that the space of at least 500 mm be left between the product bottom and the ground.
- For product installed at its back, the space of at least 200 mm should be left at both left and right sides; for product installed at its left side, the space of at least 200 mm should be left in front and at back of product.
- For product installed at its back, the space of at least 800 mm should be left in front of product; for product installed at its left side, the space of at least 800 mm should be left at its right side.
- Install the product upright at a proper position.



Back Installation



Side Installation

Earthing Requirements

- When installing the equipment, ground the equipment before any operations and remove the ground cable only after you remove all the other components and cables from the equipment.
- Ensure that the ground conductor is intact.
- Do not operate the equipment in the absence of a suitably installed ground conductor.
- The equipment must be connected to the PGND permanently. Before operating the equipment, check the electrical connections of the equipment and ensure that the equipment is properly grounded.

3.3.2 Tools

Prepare the following tools for installation.

Regular Tool	Philips driver, flat blade screwdriver, adjustable wrench, Allen wrench, cross-type torque screwdriver, combination wrench, rubber hammer, and torque wrench.

Safety Tool	Antistatic wrist strap, safety belt, helmet, safety rope, and slip-proof gloves.
Cable Making Tool	Wire stripper, wire crimper, and wire cutter.
Measuring Tool	Multimeter, tape measure, level.
Auxiliary Tool	Fixed pulley, step ladder, marker pen, percussion drill, electrical tape, anti-UV cable tie, label, screw kit, expansion screw, utility knife, heat gun, and duct tape.

3.3.3 Materials

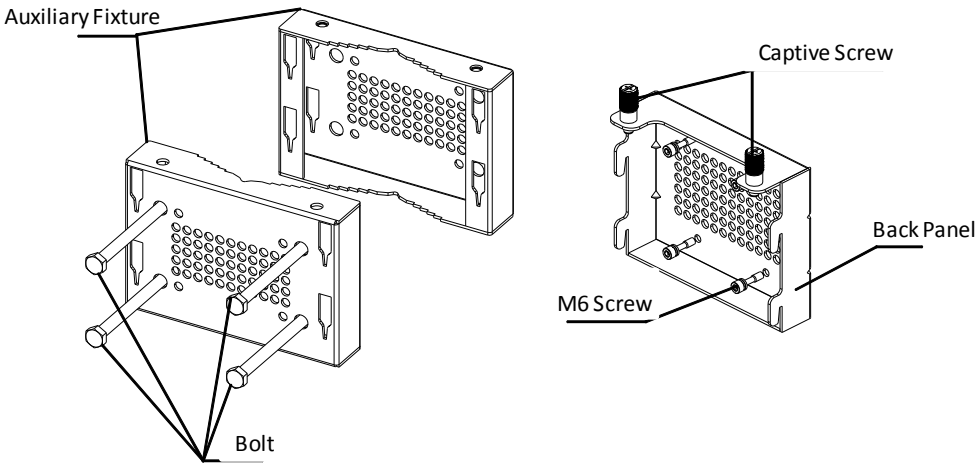
Before installation, check that all materials are well received.

3.4 Product Installation

The iBS can be mounted on a pole or wall as per needs.

3.4.1 Knowing Installation Parts

The following figure shows parts needed for iBS installation.



3.4.2 Installing iBS

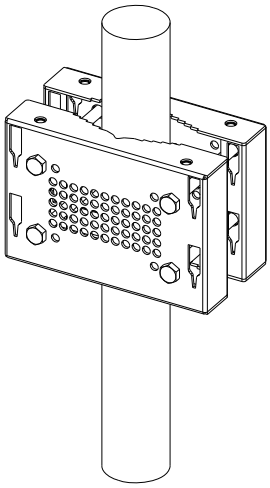
3.4.2.1 Installing iBS on a Pole

You can install iBS on a metal at the back or left side of iBS.

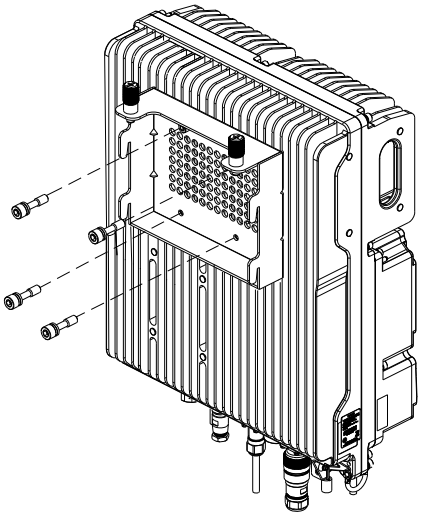
Installing iBS at Back

1. Mark the installation position of the auxiliary fixture on the pole by using a marking pen.

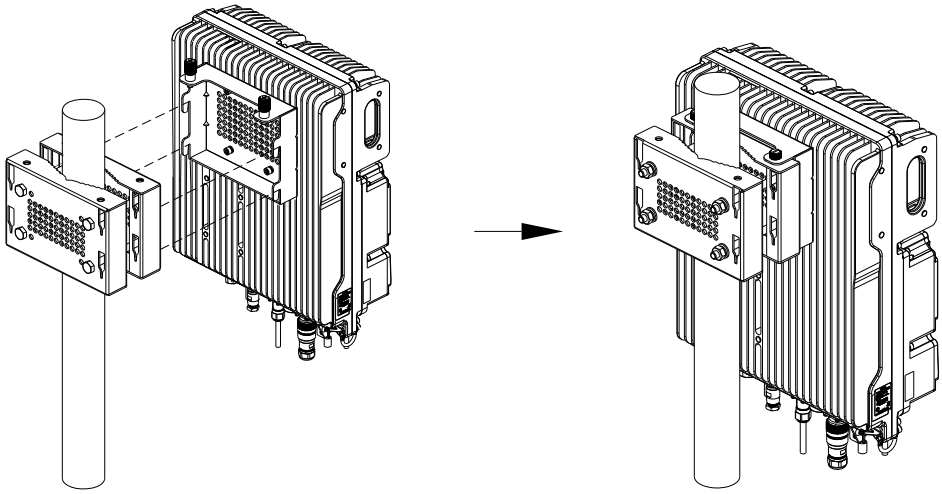
2. Place the auxiliary fixture onto the pole, insert four bolts into the auxiliary fixture and then tighten four nuts by using a torque wrench.



3. Secure the back panel onto the back of the iBS using four M6 screws.

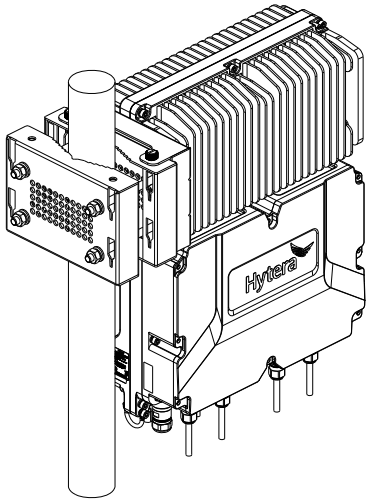


4. Insert the back panel into the auxiliary fixture and tighten the captive fasteners on the back panel of iBS.



Installing iBS at Left Side

Installing iBS at left side and installing iBS at back are almost the same. The only difference is that the back panel is secured to the left side rather than back of the iBS.

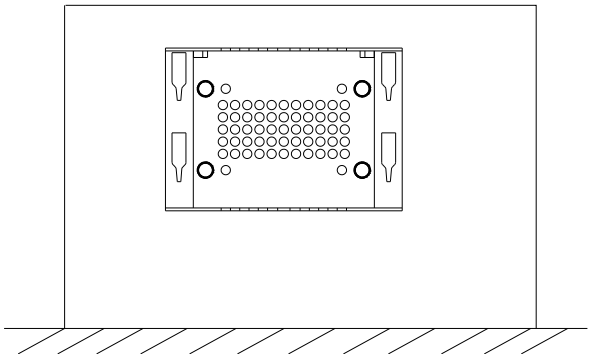


3.4.2.2 Installing iBS on a Wall

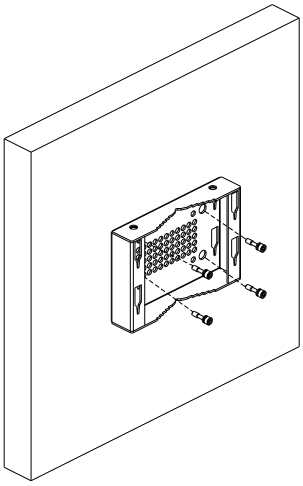
You can install iBS on a wall at the back or left side of iBS.

Installing iBS at Back

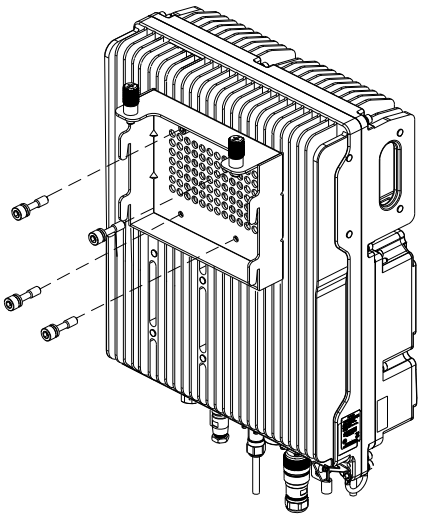
1. Place the auxiliary fixture on the wall at the installation position and then mark the anchor points by using a marking pen.



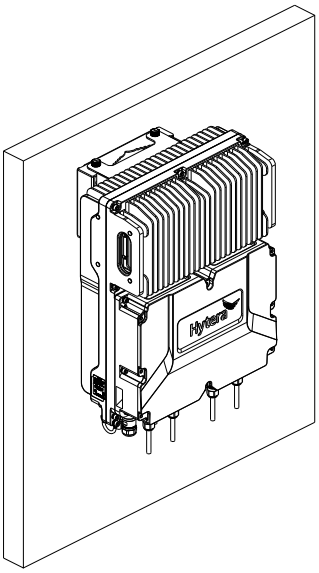
2. Drill holes at the anchor points and then install the expansion bolt assemblies.
3. Fit the auxiliary fixture on the expansion bolts, and then tighten the bolts.



4. Secure the back panel onto the back of the iBS using four M6 screws.

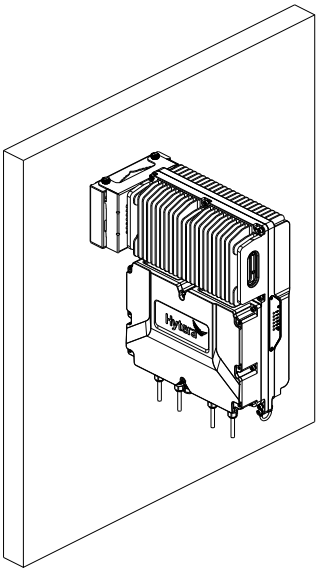


5. Insert the back panel into the auxiliary fixture and tighten the captive fasteners on the back panel of iBS.



Installing iBS at Left Side

Installing iBS at left side and installing iBS at back are almost the same. The only difference is that the back panel is secured to the left side rather than back of the iBS.



3.4.3 Laying out Cables

3.4.3.1 General Requirements

Lay out cables according to requirements to reduce interference between them.

Safety Requirements

- Lay out cables away from sharp objects or jagged walls, or protect cables using conduit.
- Lay out cables away from heat sources, or add heat-insulation materials between cables and heat sources.

Requirements for binding cables

- Bind same cables together.
- Bind cables securely and neatly, without damaging the cable jackets.
- Ensure that cable ties face the same direction and are aligned in rows horizontally.
- After installing cables, attach labels or tags to the two ends of each cable.
- Cables of different types cannot be crossed.

Requirements for laying out power cables

- The routing of power cables must meet engineering design drawing requirements.
- If the power cable length is insufficient, replace the power cable. The power cable must be complete and cannot have splices or welding points.
- Avoid knotting or twisting the cable.

Requirements for laying out ground cables

- The ground cable cannot be led in aerially, but buried in the earth or arranged indoor.

- Ground cables must be separated from signal cables to reduce interference between them.
- All metal components in the shell must be securely connected to the ground cable.

Requirements for laying out optical fibers

- Do not bind optical fibers where they are bent.
- Do not press optical fibers forcibly or crush optical fibers with force. Leave sharp objects away from optical fibers to prevent damage to optical fibers.
- Coil up redundant optical fibers round specialize devices such as the splice tray.
- Coil optical fibers gently and do not break them.
- Cover optical fiber connectors with protective caps.

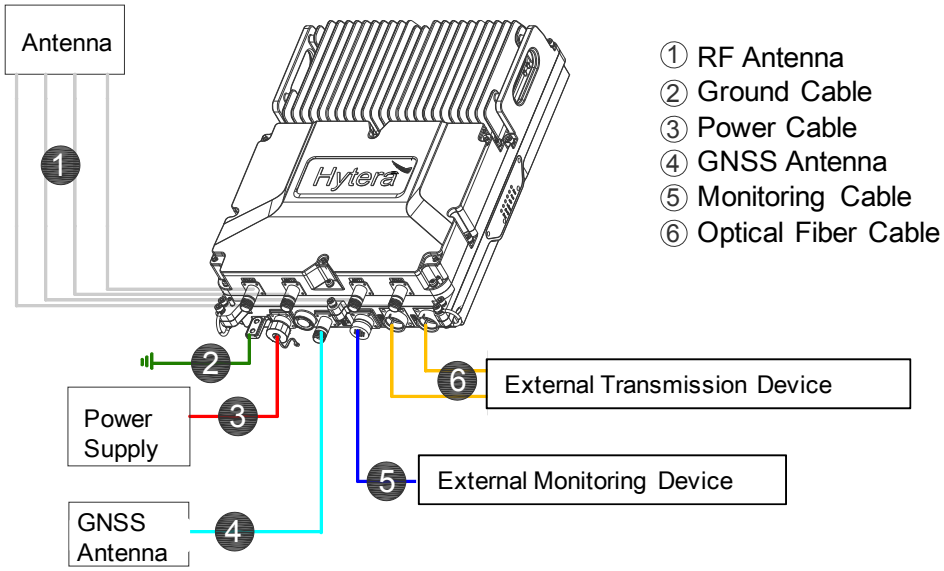
3.4.3.2 Cable Connection Description

The following table describes the connection of respective cables.

Cable	One end (at iBS)		Other end
	Connector	Connected to ……	Connected to ……
Ground Cable	Ring terminal	Ground terminal	Grounding bar
RF Antenna	N-M	RXD0/RXD1/ANT0/ANT1 interface	Antenna system
Power Cable	Round electric connector	PWR interface	External power supply
Optical Fiber	SFP/SFP+	SFP0/SFP1 interface	External transmission device (such as switch, router)
Monitoring Cable	8-pin aviation connector	RET interface	External monitoring device
GNSS Antenna	N-M	GNSS interface	GNSS SPD

3.4.3.3 Wiring Diagram

The following figure shows wiring diagram of iBS.



3.4.3.4 Installing Ground Cable

1. Make a ground cable having ring terminals with shrink tubing at both ends.

   The metal wires must be completed sealed, as shown in the figure below.

2. Connect one end of the cable to ground connector at bottom of iBS and the other end to earthing bar.
3. Attach labels or tags to the installed cable.

3.4.3.5 Installing Power Cable

Note

Power cable delivered with iBS is 2*12AWG cable having a maximum length of 60 meters. If distance between iBS and external power supply exceeds 60 meters, the cable diameter shall be increased accordingly.

1. Connect one end of the cable to PWR connector of the iBS and the other end to external power supply.
2. Lay out the cable according to design requirements and fix the cable with cable ties
3. Attach labels or tags to the cable.

4. Turning On/Off iBS

4.1 Turning On iBS

To turn on iBS, toggle the power switch on iBS to the ON position.

4.2 Turning Off iBS

To turn off iBS, toggle the power switch on iBS to the OFF position.

5. Care and Cleaning

To guarantee optimal performance as well as a long service life of the product, please follow the tips below.

Caution
Be sure to turn off the product before cleaning.

Product Care

- Attach the connector cover when the connector is not in use.
- Do not pierce, strike, throw or scrape the product.
- Keep the product away from substances that can corrode the circuitry.
- Keep the device dry.
- Keep this device far away from overheating, which may shorten lifespan of the electronic parts, or even distort or melt the plastic parts.
- Keep this device far away from extreme cold. Otherwise, the circuit board may be damaged by vapor generated when the device is used at normal temperature.

Product Cleaning

- Clean up the dust and fine particles on the product surface and charging piece with a clean and dry lint-free cloth or a brush regularly.
- Use a non-woven cloth with neutral cleanser to clean the device after long-time use. Do not use chemical preparations such as stain removers, alcohol, sprays or oil preparations, so as to avoid potential damage on the surface. Make sure the product is completely dry before use.

6. Specifications

DS-6250 U1 specification			
	Item		Limit
General	Frequency range		RX: 400-460MHz, TX: 410-470MHz
	Operating voltage		DC -48V
	Operating voltage range		-37V/DC~-60V/DC
	Maximum power dissipation		＜550W
	Bandwidth		5MHz
	Duplex Separation		10MHz
	Channel Bandwidth		12.5K
	Operating temperature		-40℃～+55℃
	Storage temperature		-40℃～+85℃
	Humidity		5%RH~100%RH
	IP Code		IP65
	Size（mm）（W*L*H）		435x340x157
	Weight（kg）		26Kg
Receiver	Maximum usable sensitivity	Normal	≤-122dBm@BER 5%
		Extreme	≤-121dBm@BER 5%
	Adjacent channel selectivity		≥ -47dBm
	Co-channel rejection		≥-12dB
	Blocking		≥ -23dBm（ @ ±1M， ± 2M， ±5M， ±10M）
	Intermodulation response rejection		≥ -37dBm
	Error behaviour at high input levels		≤0.01%(@input 10dBm)
	Spurious response rejection		≥ -37dBm
	Spurious radiations	9KHz ～ 150KHz	≤-57dBm
		150KHz ～ 30MHz	≤-57dBm

		30MHz ～ 1GHz	≤-57dBm
		1GHz ～ 12.75GHz	≤-47dBm
Transmitter	Output power		46dBm
	Power Stability		±1.5dB
	FSK Bit Error		≤0.01%
	Frequency error		≤±1ppm
	Occupied Bandwidth		≤8.5KHz
	Intermodulation attenuation		≤70dBc
	Adjacent Channel Power Ratio	adjacent channel（F0 ±12.5kHz）	≤60dBc
		alternate channel（F0 ±25kHz）	≤70dBc
	Spurious Emissions	9KHz ～ 150KHz	≤-36dBm
		150KHz ～ 30MHz	≤-36dBm
		30MHz ～ 1GHz	≤-36dBm
		1GHz ～ 12.75GHz	≤-30dBm