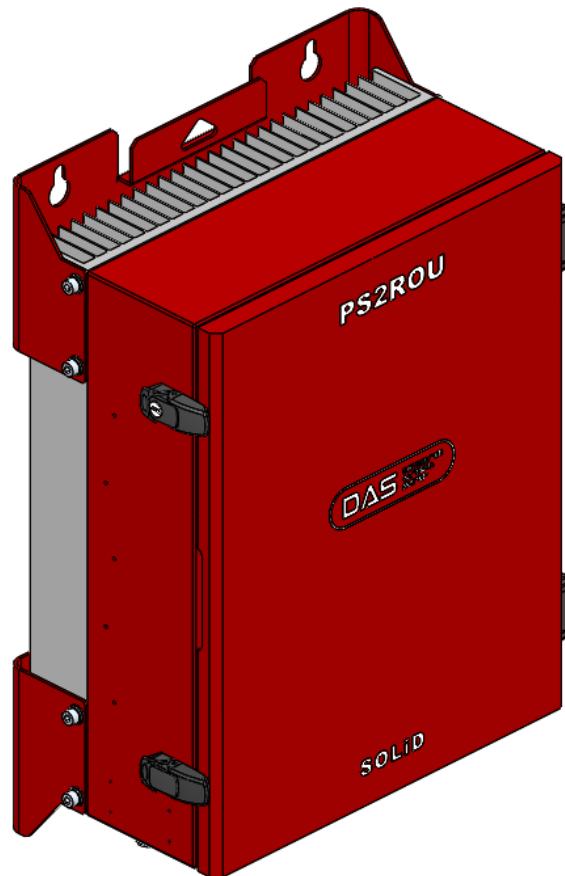


ALLIANCE_PS2ROU

User Manual



REVISION HISTORY

Version	Issue Date	No. of Pages	Initials	Details of Revision Changes
V 1.0	Sep. 01, 2019		Original	

Technical Support

SOLID serial numbers must be available to authorize technical support and/or to establish a return authorization for defective units. The serial numbers are located on the back of the unit, as well as on the box in which they were delivered. Additional support information may be obtained by accessing the SOLiD Tehcnology, Inc. website at www.solid.co.kr or send email at sjkim@solid.co.kr

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Contents

Section1	<i>Safety & Certification Notice</i>	5
Section2	<i>System configuration and Functions</i>	8
	2.1 PS2ROU (Public Safety 2W Remote Unit)	8
	2.1.1 Specifications of PS2ROU	9
	2.1.2 Block Diagram of PS2ROU	10
	2.1.2.1 PS2ROU block diagram	10
	2.1.2.2 ROU inner look	11
	2.1.2.3 PS2ROU part list	12
	2.1.3 Function by unit	13
	2.1.3.1 Public Safety 2W Remote Drive Unit (PS2RDU)	13
	2.1.3.2 PS2ROU Power Supply	15
	2.1.3.3 Remote Optic(ROPTIC)	16
	2.1.3.4 Remote Central Processor Unit (RCPU)	17
	2.1.3.5 Multiplexer	18
	2.1.4 Bottom of PS2ROU	19
	2.1.4.1 Functions	19
Section3	<i>System Installation</i>	20
	3.1 PS2ROU Installation	20
	3.1.1 Tools	20
	3.1.2 PS2ROU Enclosure installation	21
	3.1.3 PS2ROU Wall Mount Installation	22
	3.1.4 PS2ROU components	23
	3.1.4 PS2ROU Optical Cable	24
	3.1.5 PS2ROU ALM IN/OUT Port cabling	25
	3.1.6 Mounting of PS2RDU	25

Contents of Figure

Figure 3. PS2ROU	8
Figure 4. PS2ROU outer Look	9
Figure 5. PS2ROU Block diagram	10
Figure 6. Inside of Remote Unit.....	11
Figure 7. PS2RDU Outer Look.....	13
Figure 10. R OPTIC Outer Look	17
Figure 11. AC-DC RPSU Outer Look	17
Figure 12. Multiplexer Outer Look.....	18
Figure 14. The Bottom Look of PS2ROU.....	19
Figure 17. How to install ROU	21
Figure 18. Dimension used to install PS2ROU on the WALL.....	22
Figure 23. Location of Optical Connector.....	24
Figure 26. Location of ALM IN/OUT Connector.....	25
Figure 29. Location of each modules in the PS2ROU	25

Section 1

Safety & Certification Notice

“Only qualified personnel should handle the DAS equipment. Any person involved in installation or service of the DAS should understand and follow these safety guidelines.”

- Obey all general and regional installation and safety regulations relating to work on high voltage installations, as well as regulations covering correct use of tools and personal protective equipment.
- The power supply unit in repeaters contains dangerous voltage level, which can cause electric shock. Switch the mains off prior to any work in such a repeater. Any local regulations are to be followed when servicing repeaters.
- When working with units outdoors, make sure to securely fasten the door or cover in an open position to prevent the door from slamming shut in windy conditions.
- Use this unit only for the purpose specified by the manufacturer. Do not carry out any modifications or fit any spare parts which are not sold or recommended by the manufacturer. This could cause fires, electric shock or other injuries.
- Any DAS system or Fiber BDA will generate radio (RF) signals and continuously emit RF energy. Avoid prolonged exposure to the antennas. SOLiD recommends maintaining a 500 cm minimum clearance from the antenna while the system is operating.
- Antennas must be installed in accordance with FCC 27.50 and SRSP 517. With 17dBi gain antennas the height of the antenna above average terrain (HAAT) must not exceed 557.40m. For different gain antennas refer to the relevant rules and the local licensing authorities.
- Do not operate this unit on or close to flammable materials, as the unit may reach high temperatures due to power dissipation.
- Do not use any solvents, chemicals, or cleaning solutions containing alcohol, ammonia, or abrasives on the DAS equipment. Alcohol may be used to clean fiber optic cabling ends and connectors.
- To prevent electrical shock, switch the main power supply off prior to working with the DAS System or Fiber BDA. Never install or use electrical equipment in a wet location or during a lightning storm.
- Do not look into the ends of any optical fiber or directly into the optical transceiver of any digital unit. Use an optical spectrum analyzer to verify active fibers. Place a protective cap over any radiating transceiver or optical fiber connector to avoid the potential of radiation exposure.
- Allow sufficient fiber length to permit routing without severe bends.

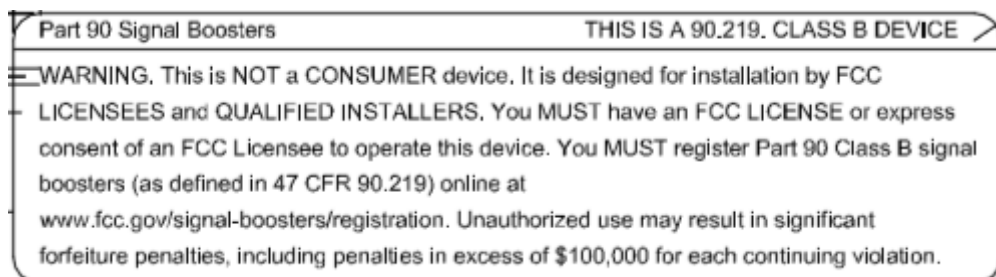
- For pluggable equipment, make sure to install the socket outlet near the equipment so that it is easily accessible.
- A readily accessible disconnect device shall be incorporated external to the equipment.
- This power of this system shall be supplied through wiring installed in a normal building.

If powered directly from the mains distribution system, it shall be used additional protection, such as overvoltage protection device

- Only 50 ohm rated antennas, cables and passive equipment shall be used with this remote. Any equipment attached to this device not meeting this standard may cause degradation and unwanted signals in the bi-directional system. All components connected to this device must operate in the frequency range of this device.
- Only 50 ohm rated antennas, cables and passive components operating from 150 - 3 GHz shall be used with this device.
- The head end unit must always be connected to the Base Station using a direct cabled connection. This system has not been approved for use with a wireless connection via server antenna to the base station.
- Access can only be gained by SERVICE PERSONS or by USERS who have been instructed about the reasons for the restrictions applied to the location and about any precautions that shall be taken; and
- Access is through the use of a TOOL or lock and key, or other means of security, and is on trolled by the authority responsible for the location.
- Notice! Be careful not to touch the Heat-sink part due to high temperature.



- **Signal booster warning label message should include**



Prior to equipment use the service must be registered with the FCC. This can be done through the FCC's website at <https://signalboosters.fcc.gov/signal-boosters>.

- Certification

- FCC: This equipment complies with the applicable sections of Title 47 CFR Parts 90(Class B)
 - **Use of unauthorized antennas, cables, and/or coupling devices not conforming with ERP/EIRP and/or indoor-only restrictions is prohibited.**
 - **Home/ personal use are prohibited.**
- UL/CUL: This equipment complies with UL and CUL 1950-1 Standard for safety for information technology equipment,including electrical business equipment
- FDA/CDRH: This equipment uses a Class 1 LASER according to FDA/CDRH Rules.This product conforms to all applicable standards of 21 CFR Chapter 1, Subchapter J, Part 1040

- **IC Booster warning label message should include**

WARNING: This is NOT a CONSUMER device. It is designed for installation by an installer approved by an ISED licensee. You MUST have an ISED LICENCE or the express consent of an ISED licensee to operate this device.

Section 2

System configuration and Functions

2.1 PS2ROU (Public Safety 2W Remote Unit)

PS2ROU receives TX optical signals from ODU and converts them into RF signals. The converted RF signals are amplified through Power Amp in a corresponding PS2RDU band combined with UDCU, PAU and Cavity Filter, and then radiated to the antenna port.

When receiving RX signals through the antenna port, this unit filters out-of-band signals in a corresponding PS2RDU and sends the results to R-OPTIC to make electronic-optical conversion of them. After converted, the signals are sent to a upper device of ODU. PS2ROU can be equipped with up to three PS2RDUs and the module supports single band only.

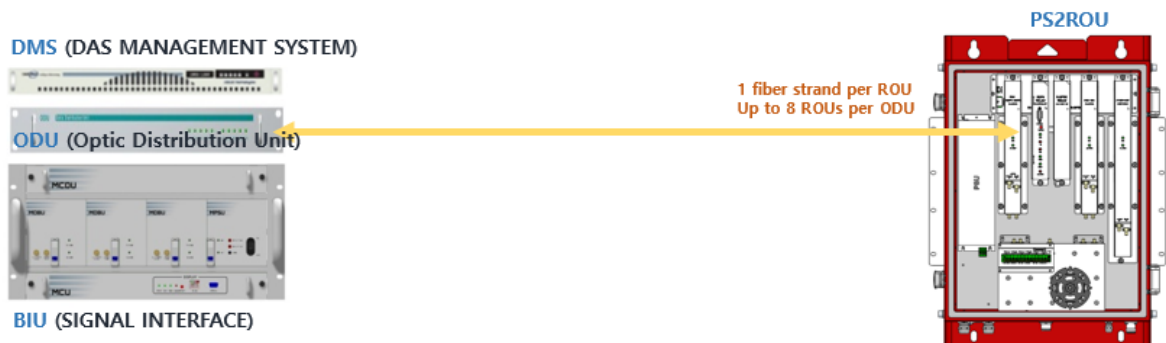


Figure 1. PS2ROU

2.1.1 Specifications of PS2ROU

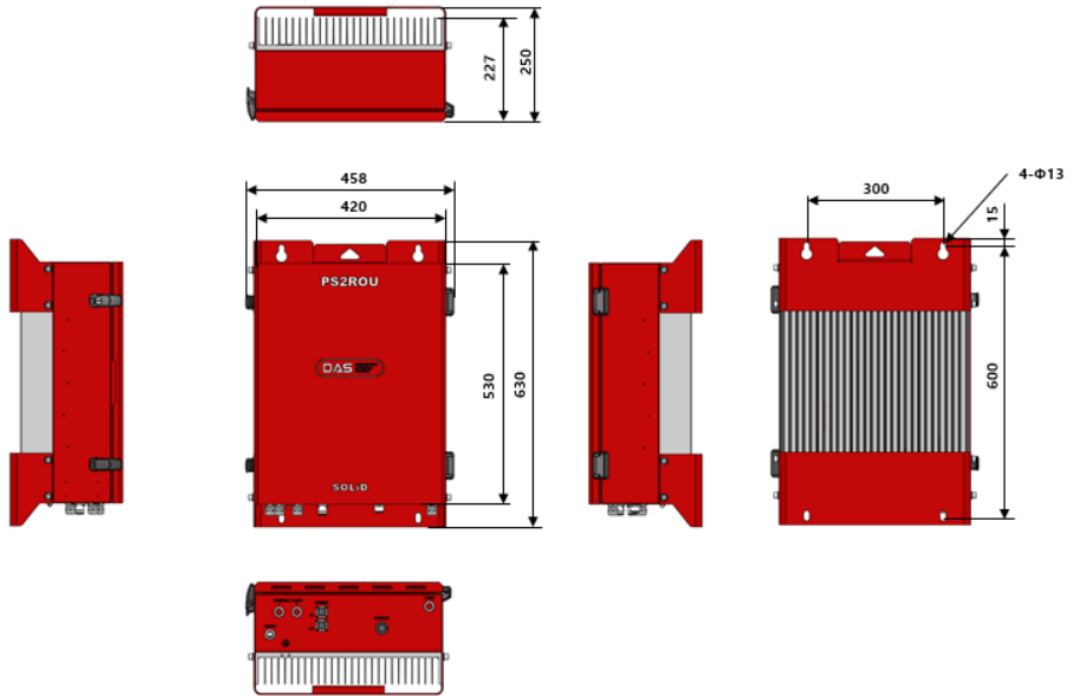


Figure 2. PS2ROU outer Look

Item	Spec.		Remark
	PS2ROU		
The rated mean output Power per band	700PS_FN	+33dBm	
	800PS	+33dBm	
	VHF/UHF	+24dBm	
	900I_PA	+33dBm	
The nominal downlink bandwidth	700PS_FN	17MHz	FCC : 758~775MHz ISED : 758~775MHz
	800PS	10MHz	FCC : 851~861MHz ISED : 851~861MHz
	VHF	38MHz	FCC: 150~174MHz ISED : 138~174MHz
	UHF	132MHz	FCC: 406.1~512MHz

			ISED : 406.1~430MHz 450~470MHz
	900I_PA	6MHz	FCC : 929~930MHz 935~940MHz ISED : 929~930MHz 932~932.5MHz 932.5~935MHz 935~940MHz
The nominal Uplink bandwidth	700PS_FN	17MHz	788~805MHz
	800PS	10MHz	806~816MHz
	VHF	80MHz	136~216MHz
	UHF	132MHz	380~512MHz
	900I_PA	6MHz	896~902MHz

2.1.2 Block Diagram of PS2ROU

2.1.2.1 PS2ROU block diagram

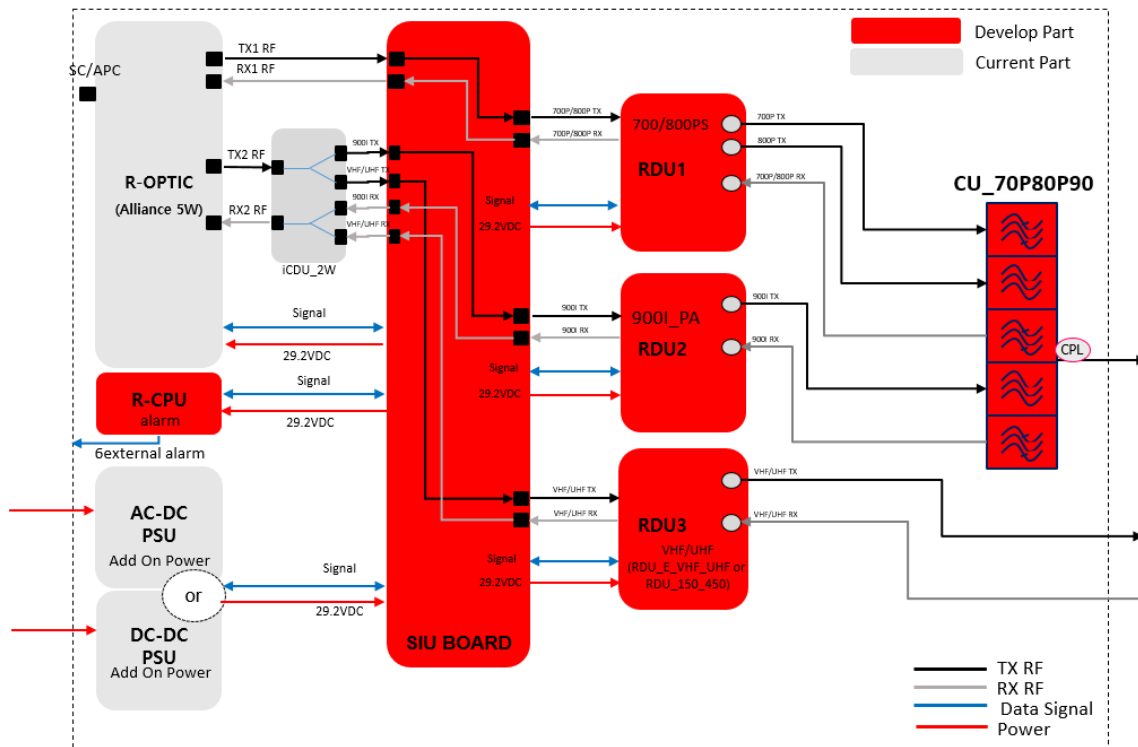


Figure 3. PS2ROU Block diagram

2.1.2.2 ROU inner look

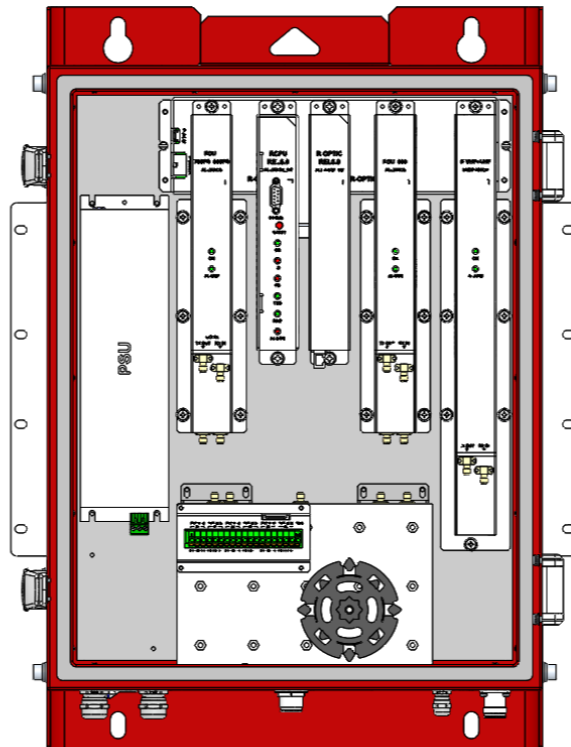


Figure 4. Inside of Remote Unit

** In the HARU enclosure, not need to install R-Optic

2.1.2.3 PS2ROU part list

Unit	Description
PS2RDU	Remote Drive Unit
	Amplify TX signals
	Amplify RX signals
	Remove other signals through BPF
RPSU (AC)	Remote AC Power Supply Unit
	Input power: 100~240 VAC
	Output power: +29.2 VDC
RPSU (DC)	Remote DC Power Supply Unit
	Input power: -42 ~ -56 VDC
	Output power: +29.2 VDC
R-OPTIC	Remote Optic
	Convert RF signals into optical signals and vice versa; Compensate optical loss
	Communicate with legacy BIU or iBIU/OEU though the FSK modem
	5dBo optical link between ODU (OM4) and ROU
	10dBo optical link between ODU (OM1) and ROU
	Fiber Connector: SC/APC Connector
	Fiber Type: Single Mode Fiber
	Optical Wavelength: 1310/1550 WDM
RCPU	Remote Central Processor Unit
	Controls signal of each unit
	Monitors legacy BIU or iBIU/ODU/OEU through the FSK modem
CU-70P80P90I	Multiplexer 3-band
	Combine TX signals from 3 RDUs; Distribute RX signals to 3 RDUs
	Allow to use a single antenna port for 5 bands
ROU Enclosure	Enclosure to satisfy UL Type 4X

2.1.3 Function by unit

2.1.3.1 Public Safety 2W Remote Drive Unit (PS2RDU)

When receiving TX signals from each band through Remote Optic, PS2RDU filters the signals and amplifies them with High Power Amplifier. The unit also filters RX signals given through amplifies them to send the signals to Remote Optic. In the unit, there is ATT to adjust gain. PS2RDU consist of UDCU, PAU like below figure and all modules are merged with one package.

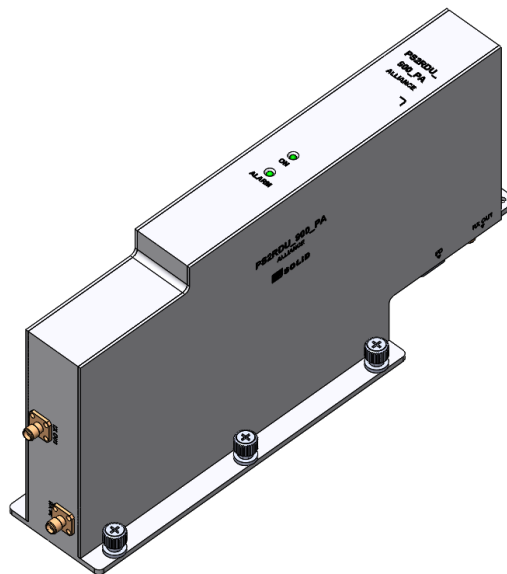


Figure 5. PS2RDU Outer Look

PS2RDU devices are varied for each frequency band , including the following:

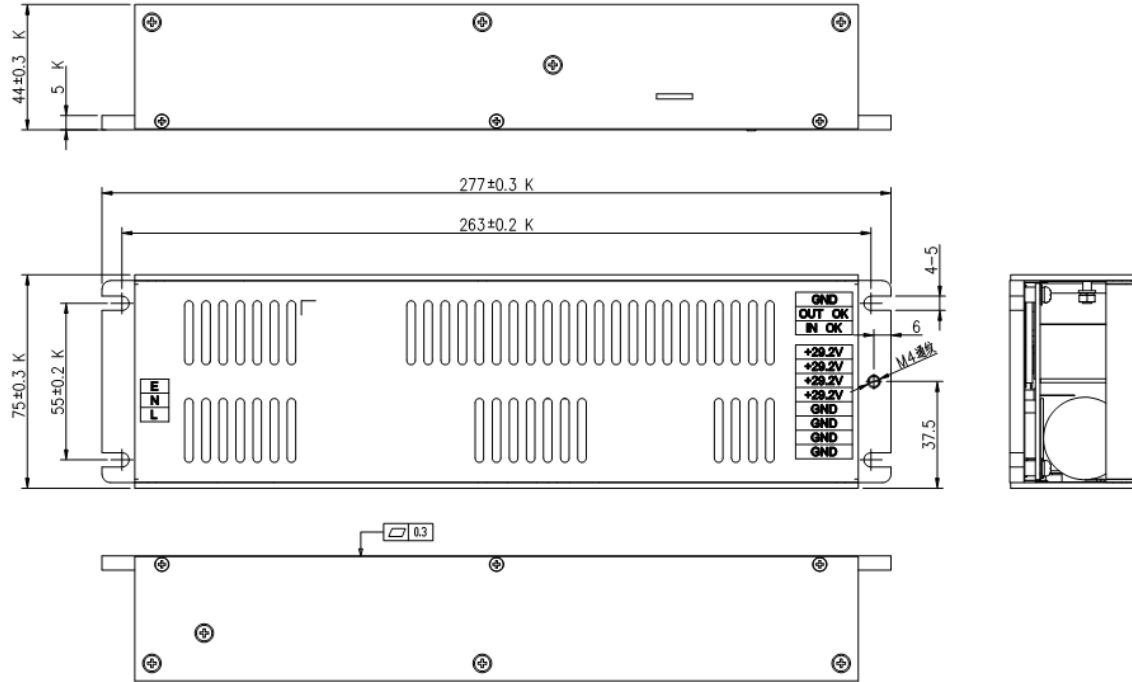
No	Unit Naming	Description	Frequency (Bandwidth)	
			TX	RX
1	PS2RDU_E_VHF_UHF	Dual band	VHF > FCC: 150~174MHz ISED : 138~174MHz UHF > FCC: 406.1~512MHz ISED : 406.1~430MHz 450~470MHz	VHF : 136~216MHz UHF : 380~512MHz
2	PS2RDU_80P_70P_FN	Dual band	700PS > FCC : 758~775MHz	80P : 806~816MHz 70P : 788~805MHz

			ISED : 758~775MHz 800PS > FCC : 851~861MHz ISED : 851~861MHz	
3	PS2RDU_90I_PA	Single band	FCC : 929~930MHz 935~940MHz ISED : 929~930MHz 932~932.5MHz 932.5~935MHz 935~940MHz	896~902MHz

2.1.3.2 PS2ROU Power Supply

AC Power Supply

The PS2ROU supports only AC 100~240V input power and only a single type of power cable is provided. The pin discription of AC port is as below. Pay attention to the correct polarity.

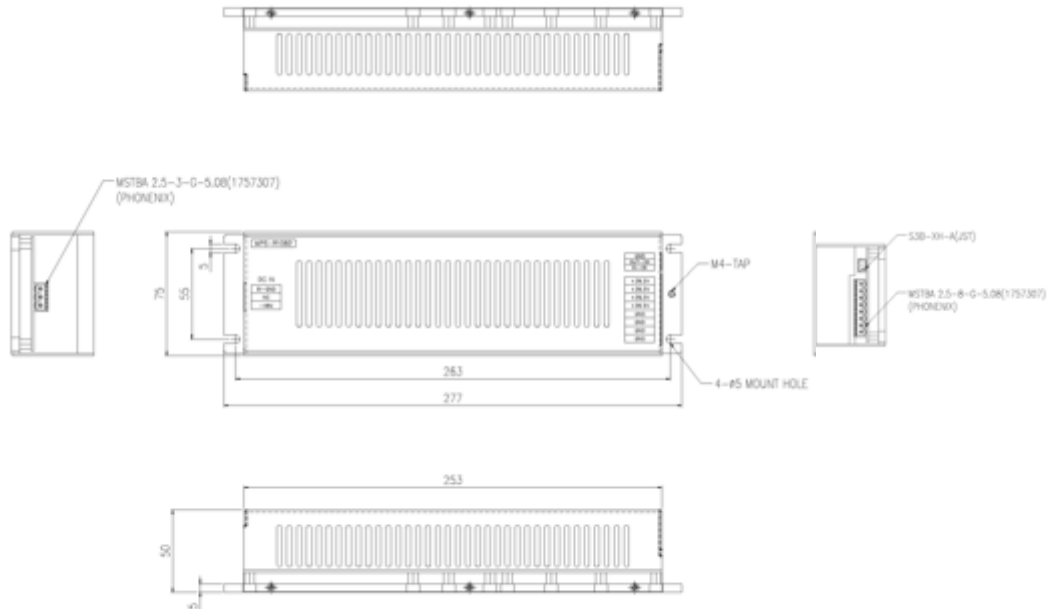


Check if the connection is the same as one seen in the table above and make sure to turn the power ON. The figure below is the AC power cable that comes with the unit.

Figure 4.5– AC Power Supply

DC Power

The N2ROU supports only DC -48V input power and a single type of power cable is provided. The pin discription of DC port is below. Pay attention to the correct polarity.



Check if the connection is the same as one seen in the table above and make sure trn the power ON. The figure below is the DC power cable included in the package.

Figure 4.6 – DC Power Supply

2.1.3.3 Remote Optic(ROPTIC)

Remote Optic converts optical signals into RF signals and performs vice versa. It also has internal ATT for optical compensation to compensate for optical cable loss. It provides two path in pairs(TX/RX) to transport RF signal to ARUs.

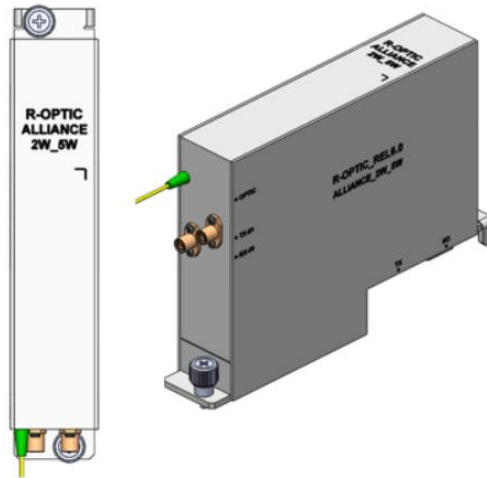


Figure 6. R OPTIC Outer Look

2.1.3.4 Remote Central Processor Unit (RCPU)

RCPU can monitor and control each module of PS2ROU. This unit receives and analyzes upper communication data from Remote Optic and reports the unit's own value to upper devices. At the front of the module, it has LED indicator to show system status, letting you check any abnormalities at a time. At the same front, it also has communication LED Indicators to show communication status with upper devices. THROUGH Local port, the unit enables you to check and control device status through PC and laptop.

It provides three interface port with ARUs to communicate with these. It also provide dry contact port, which is (1) output port and (1) input port.



Figure 7. AC-DC RPSU Outer Look

2.1.3.5 Multiplexer

Multiplexer it called combine unit(CU) works as a module to combine or distribute multiple signals into one or two antennas.

This device has a port to combine multiple signals. You need to connect input and output ports of RDU through a corresponding port.

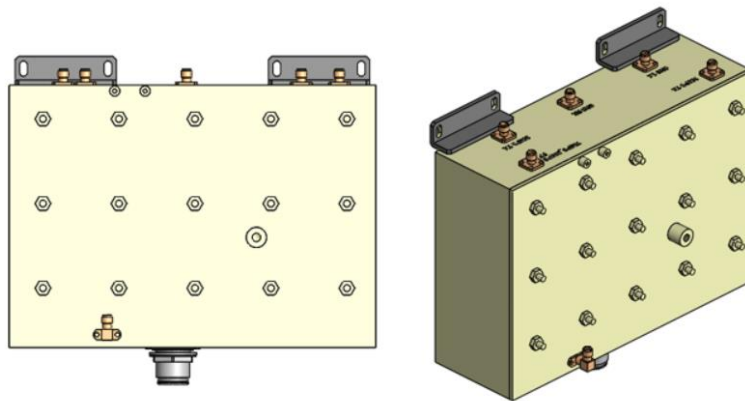


Figure 8. Multiplexer Outer Look

2.1.4 Bottom of PS2ROU

2.1.4.1 Functions

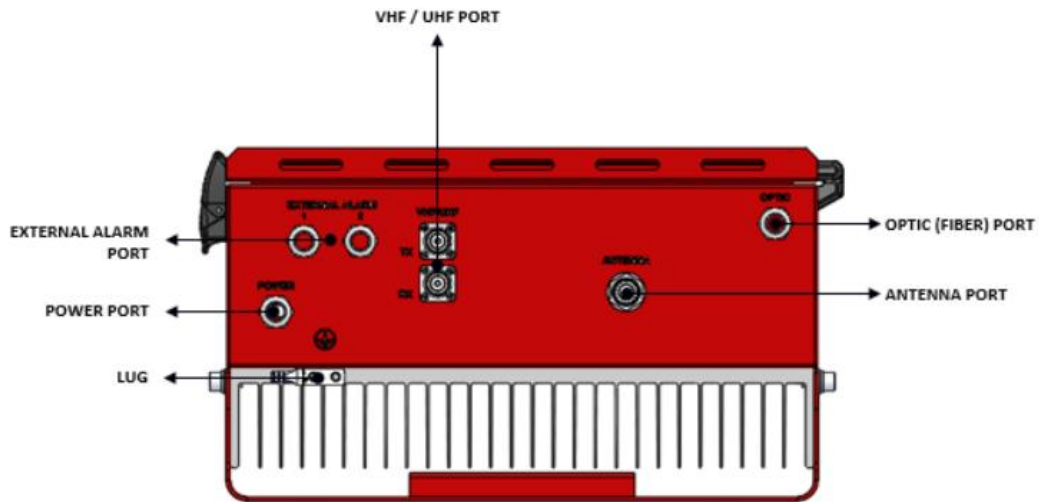


Figure 9. The Bottom Look of PS2ROU

No	Port	PS2ROU	Remark
1	Optical Port	1EA	SC/APC, Waterproof Optical Input port
2	Power Port	1EA	The cable is directly inserted in port hall.
3	VHF/UHF Port	2EA	VHF/UHF Tx port and VHF/UHF Rx Port
4	Antenna port	1EA	DIN to N type
5	External Alarm Port	2EA	6 External alarm has been located in bottom 6 external alarm could set as input and output
6	LUG	1EA	Ground

Section3

System Installation




3.1 PS2ROU Installation

This chapter describes how to install each unit and optical cables, along with power cabling method.

In detail, the chapter describes how to install shelves or enclosures of each unit, Power Cabling method and Optic Cabling and RF Interface. Furthermore, by showing power consumption of modules to be installed in each unit, it presents Power Cabling budget in a simple way. Then, it describes the quantity of components of modules to be installed in each unit and expansion method.

3.1.1 Tools

Tools needed for installation is table below

No	Tools	Q'ty	Specification	Remark
1		1	+ , 3Ø Length is more than 20mm	For fixing PS2RDU
2		1	33mm	To tighten antenna port
3		1	19mm	To CU N-type port

3.1.2 PS2ROU Enclosure installation

PS2ROU is designed to be water- and dirt-proof. The unit has the structure of one-Body enclosure. It satisfies water-proof and quake-proof standards equivalent of UL Type4X. The way to install for both PS2ROU has same method. Basically PS2ROU is attached with wall mountable bracket. PS2ROU can be mounted into either of wall or on a pole.

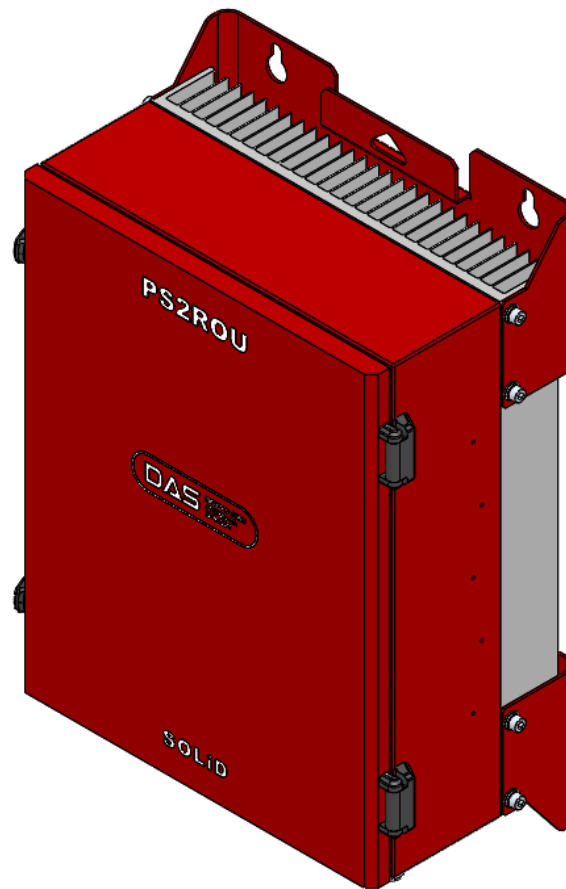


Figure 10. How to install ROU

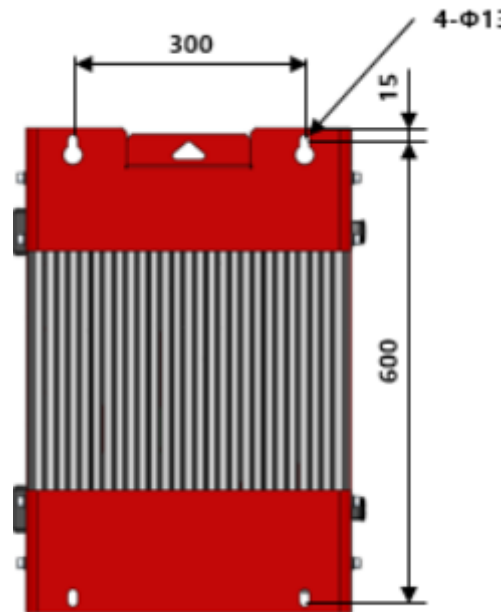


Figure 11. Dimension used to install PS2ROU on the WALL

3.1.3 PS2ROU Wall Mount Installation

PS2ROU's installation bracket is attached on Enclosure when is delivered. It doesn't need to remove bracket to install enclosure. simply after installing 4 of M12 mounting bolts, secure 4 mounting bolts tightly.

First, install 2 of M12 mounting bolts roughly half way on the enclosure and install enclosure over the bolts and secure tightly.

Second, install 2 of M12 mounting bolts under the enclosure and secure tightly.

3.1.4 PS2ROU components

PS2ROU has the following components:

No.	Unit	Description	Remark
Common Part	Enclosure	Including Wall mounting bracket	1EA
	RCPU	-	1EA
	R_OPTIC	With SC/ACP adaptor	1EA,optional
	RPSU	AC 100~240V or DC -48V	1EA
	CU-70P80P90I	This integrated combiner unit combines all bands for output to a single antenna connection.	1EA, optional
	Power Cable	The cable is directly inserted in port hall	1EA
PS2ROU	PS2RDU	Max 3RDUs in the one enclosure	Max 3EA

Basically, the common part of PS2ROU should have an enclosure and it is equipped with RCPU to inquire and control state of each module, R_OPTIC to make both of electronic-optical and optical-electronic conversions, RPSU to supply power for PS2ROU. It should have Power Cable for external rectifier or to supply required power.

In addition, PS2RDU can be mounted and removed to provide service for desired band.

3.1.4 PS2ROU Optical Cable

The Optical Connector is located at the bottom of Remote Unit enclosure fixed. Optical Cable can be connected by using connectors. The specification of compression Optic Connector is like below.

The way to install the Optical cable comply with below procedures

The procedures are

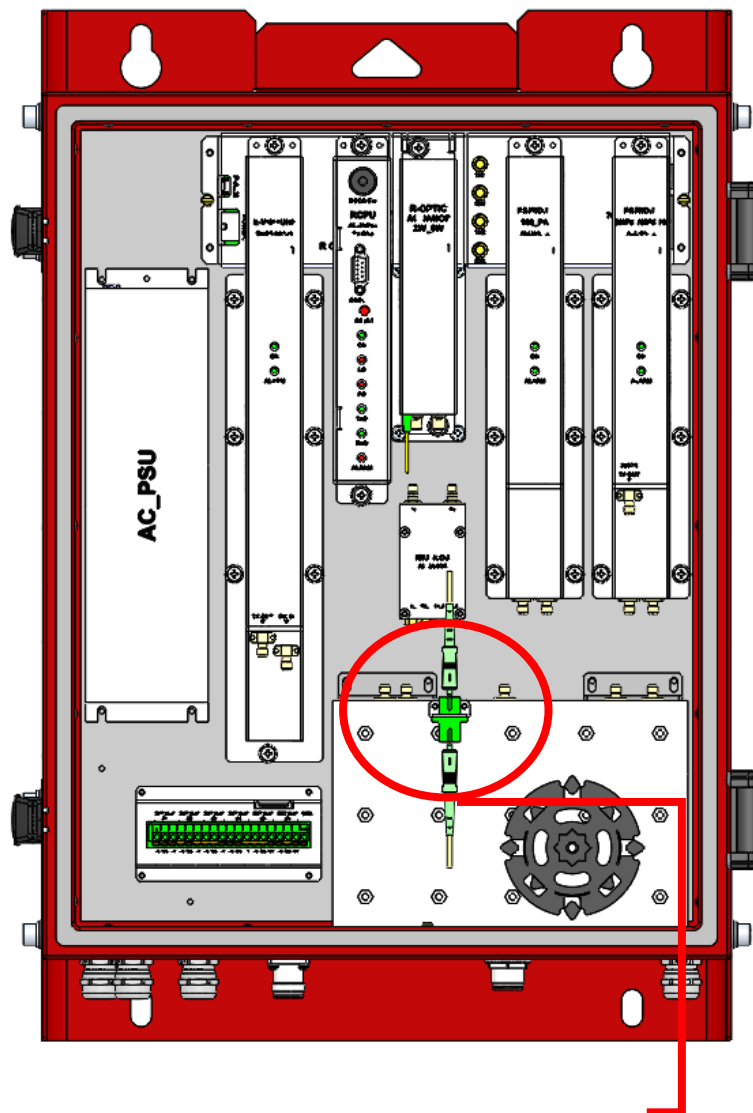


Figure 12. Location of Optical Connector

3.1.5 PS2ROU EXTERNAL ALM IN/OUT Port cabling

The ALM IN/OUT Connector is located at the bottom of Remote Unit enclosure fixed. Cable can be connected by using connectors.

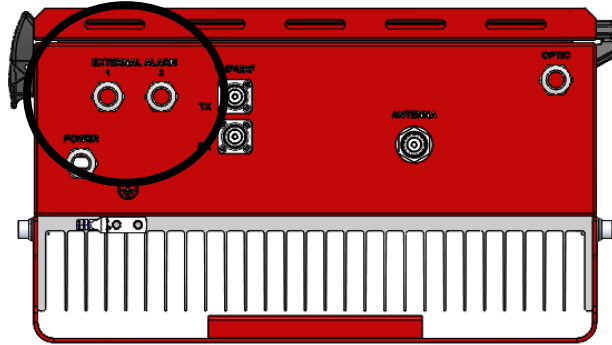


Figure 13. Location of ALM IN/OUT Connector

3.1.6 Mounting of PS2RDU

PS2ROU has slots to enable up to four PS2RDU modules to be mounted in it.

You can mount a PS2RDU into designated slot surely and should install each PS2RDU into its designated location as shown in the installation diagram on the door of enclosure.

It is not possible to provide services with a PS2RDU module alone; you need to connect PS2RDU cavity duplexer antenna port with CU's designated port.

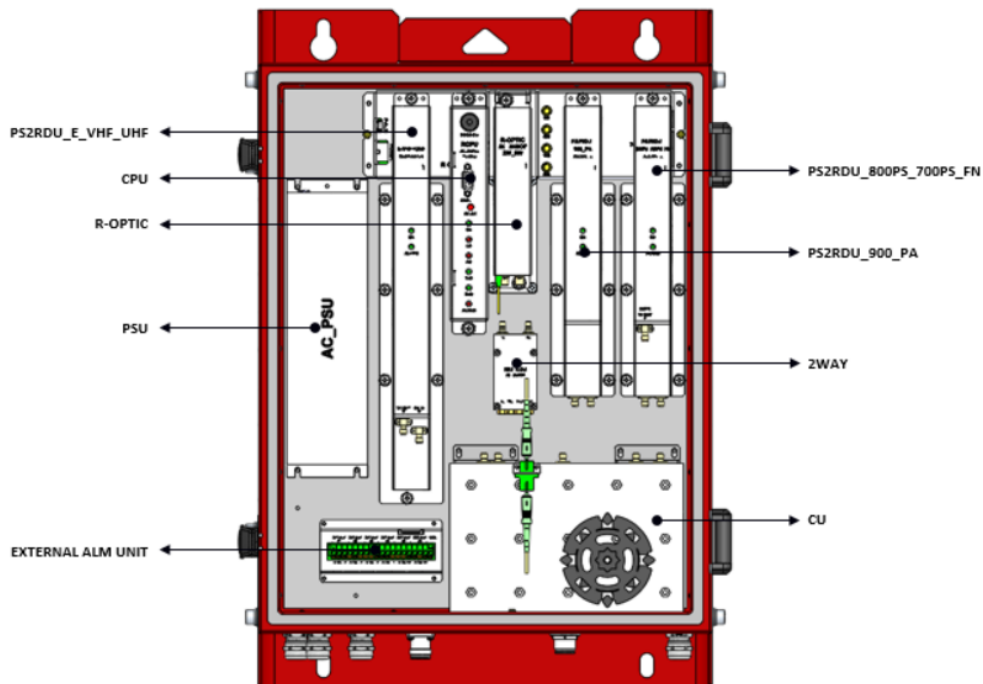


Figure 14. Location of each modules in the PS2ROU

FCC/IC User Warning

FCC PART 15.105 STATEMENT

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

FCC PART 15.21 STATEMENT

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

RF EXPOSURE STATEMENT

This equipment complies with RF radiation exposure limits set forth for an uncontrolled environment. This equipment should be installed and operated with a minimum distance of 210 cm between the radiator and your body. This transmitter must not be co-located or operating in conjunction with any other antenna or transmitter. RF exposure will be addressed at time of installation and the use of higher gain antennas require larger separation distances. (Max. antenna gain: DL 17 dBi)

RSS-GEN, SEC. 7.1.2 – (TRANSMITTERS)

Under Industry Canada regulations, this radio transmitter may only operate using an antenna of a type and maximum (or lesser) gain approved for the transmitter by Industry Canada. To reduce potential radio interference to other users, the antenna type and its gain should be so chosen that the equivalent isotropically radiated power (e.i.r.p.) is not more than that necessary for successful communication.

Conformément à la réglementation d'Industrie Canada, le présent émetteur radio peut fonctionner avec une antenne d'un type et d'un gain maximal (ou inférieur) approuvé pour l'émetteur par Industrie Canada. Dans le but de réduire les risques de brouillage radioélectrique à l'intention des autres utilisateurs, il faut choisir le type d'antenne et son gain de sorte que la puissance isotrope rayonnée équivalente (p.i.r.e.) ne dépasse pas l'intensité nécessaire à l'établissement d'une communication satisfaisante.

RSS-GEN, SEC. 7.1.2 – (DETACHABLE ANTENNAS)

This radio transmitter (identify the device by certification number, or model number if Category II) has been approved by Industry Canada to operate with the antenna types listed below with the maximum permissible gain and required antenna impedance for each antenna type indicated. Antenna types not included in this list, having a gain greater than the maximum gain indicated for that type, are strictly prohibited for use with this device.

Le présent émetteur radio (identifier le dispositif par son numéro de certification ou son numéro de modèle s'il fait partie du matériel de catégorie I) a été approuvé par Industrie Canada pour fonctionner avec les types d'antenne énumérés ci-dessous et ayant un gain admissible maximal et l'impédance requise pour chaque type d'antenne. Les types d'antenne non inclus dans cette liste, ou dont le gain est supérieur au gain maximal indiqué, sont strictement interdits pour l'exploitation de l'émetteur.

RF RADIATION EXPOSURE

This equipment complies with RF radiation exposure limits set forth for an uncontrolled environment. This equipment should be installed and operated with a minimum distance of 210cm between the radiator and your body. This transmitter must not be co-located or operating in conjunction with any other antenna or transmitter. RF exposure will be addressed at time of installation and the use of higher gain antennas require larger separation distances. (Max. antenna gain: DL 17 dBi)

RSS-102 RF EXPOSURE

L'antenne (ou les antennes) doit être installée de façon à maintenir à tout instant une distance minimum de au moins 210 cm entre la source de radiation (l'antenne) et toute personne physique. Cet appareil ne doit pas être installé ou utilisé en conjonction avec une autre antenne ou émetteur. (Max. antenna gain: DL 17 dBi)