

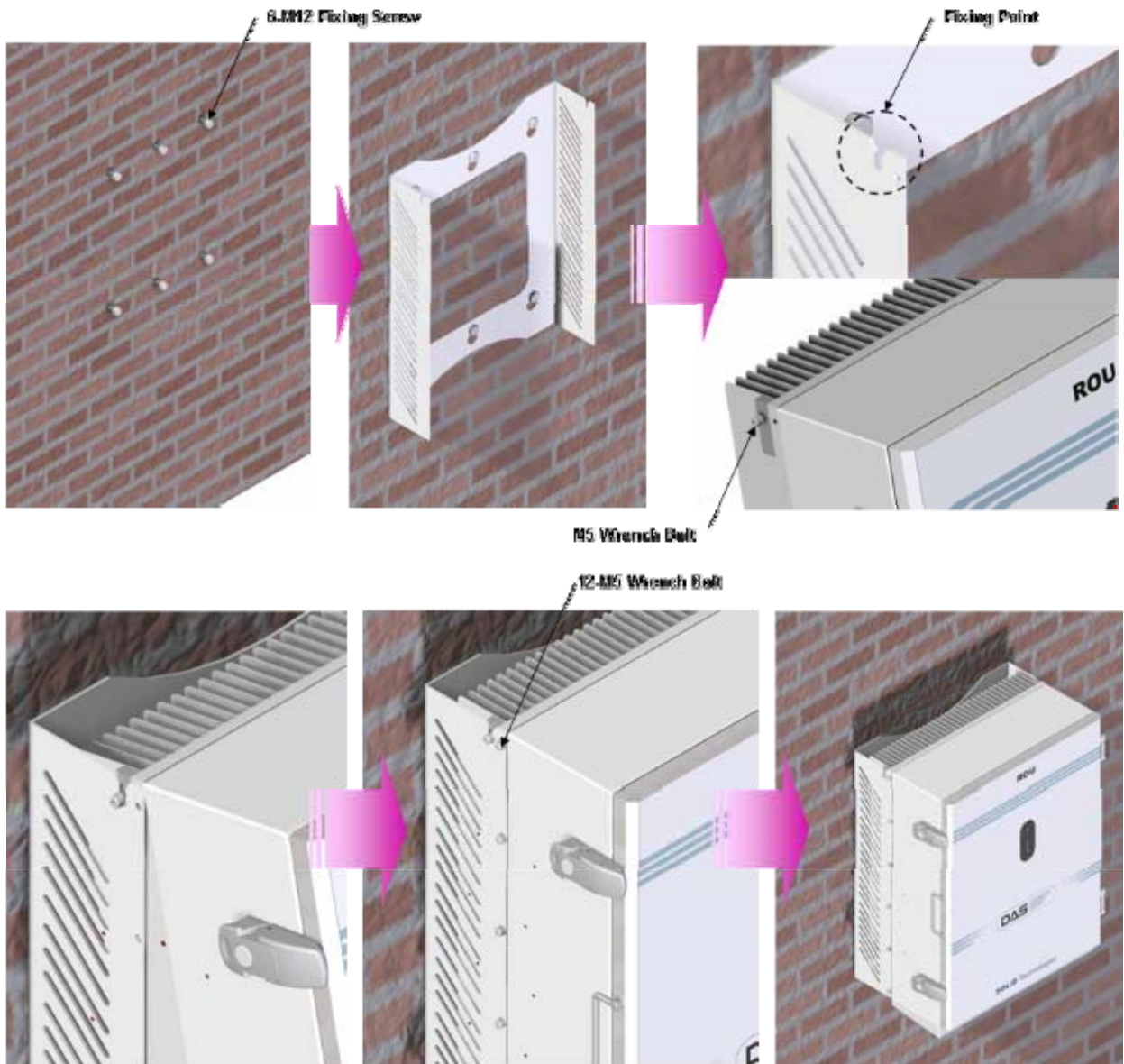
**Figure 5.6 – Dimension used to install ROU on the WALL**

### **ROU Wall Mount Installation**

Turn M12 Fixing Screws by half on the wall and fully fix the screw with a Wall Mount Bracket on it.

For convenience, the Wall Mount Bracket has fixing holes to let you easily mount an enclosure.

Turn the M5 Wrench Bolt by half at each side of the Heatsink of the enclosure.

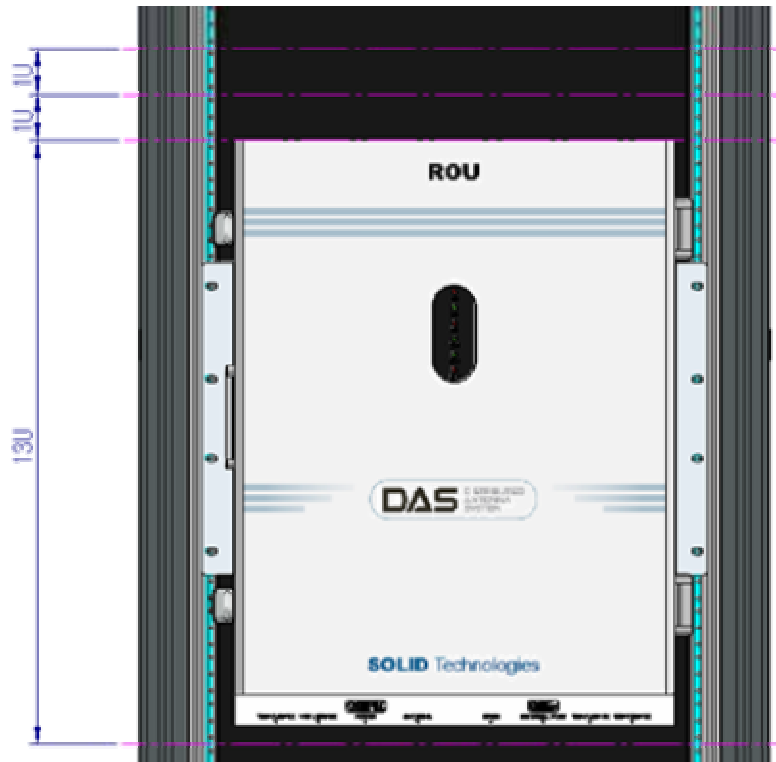


Put the enclosure with the M5 Wrench Bolt fixed on the fixing groove and fix the M5 Wrench Bolts into the remaining fixing holes.

In this case, you will use 12 M5 Wrench Bolts in total except bolts used for the fixing groove.

### **ROU Rack Mount Installation**

Like other units, ROU is designed to be inserted into a rack. The unit occupies around 13U of space except cable connection.



### ROU component

ROU has the following components:

No.	Unit	Description	Remark
Common Part	Enclosure	Including Rack & Wall cradle	1EA
	RCPU	-	1EA
	R_OPTIC	With SC/ACP adaptor	1EA
	RPSU	Alternative DC-48V or AC 120V	1EA
	Multi-Plexer	-	1EA
	Power Cable	- MS Connector with 3 hole to AC 120 plug(AC) - MS Connector with 2 lug termination(DC)	
Optional Part	RDU+BPF	800PS,800PS+900I+Paging,850C,850C+700PS, 1900P+ AWS-1 RDU, VHF+UHF(NO BPF),850C+700LTEC	Up to 3EA to be inserted

Basically, the common part of ROU 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 ROU and a Multi-Plexer to help share multiple TX/RX signals through one antenna. It should have Power Cable for external rectifier or to supply required power.

In addition, RDU can be inserted and removed to provide service for desired band (Optional).

### 5.3.2 ROU Power Cabling

ROU supports both of DC-48V and AC120V of input power. As RPSU for DC-48 and RPSU for AC120V are separated from each other, you need to select one of them in case of purchase order.

RPSU for DC -48V and RSPU for AC 120V have the same configuration and capacity while each of the units uses different input voltage from each other.

The following figure shows configuration of RPSUs for DC -48V and AC 120V.



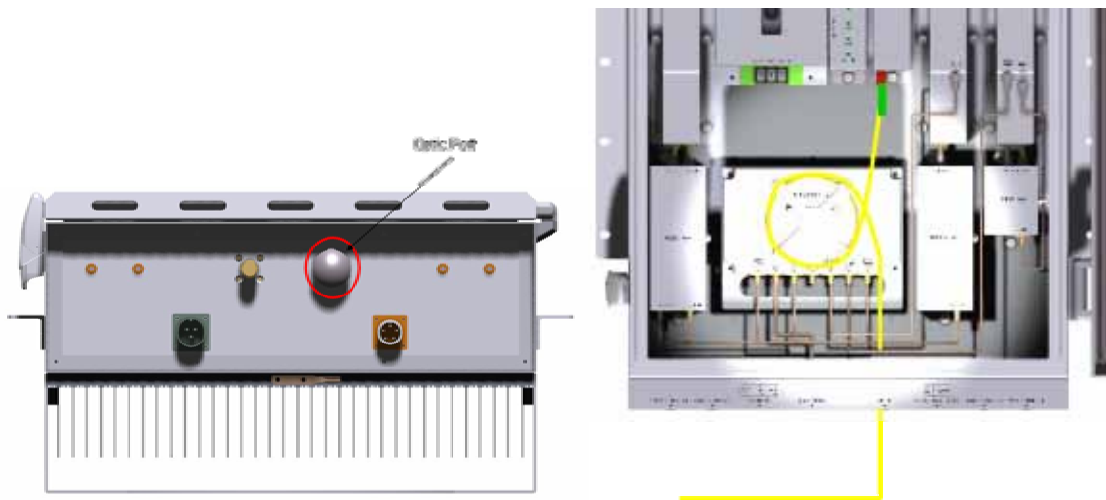
MC Connector numbering	Lug Naming		RPSU Terminal naming		Remark
	AC	DC	AC	DC	
A	AC_H	-48V	AC-H	-48V	
B	AC_N	GND	AC-N	IN_GND	
C	GND	DC NC	FG	FG	



Check if the connection is the same as one seen in the table above and make sure to turn the power ON.

### 5.3.3 Optical Cabling

ROU makes optical-electronic conversion of TX signals from upper ODU and OEU and makes electronic- optical conversion of RX signals. ROU has one optical module in it. As WDM is installed in the R\_OPTIC module, two pieces of wavelength (TX:1310nm, RX:1550nm) can be sent/received with one optical core at the same time. ROU has SC/APC of optical adaptor type. For optical adaptor, SC/APC type can be used. To prevent the optical access part from being marred with dirt, it should be covered with a cap during move. When devices are connected through optical cables, you need to clear them using alcohol to remove dirt.



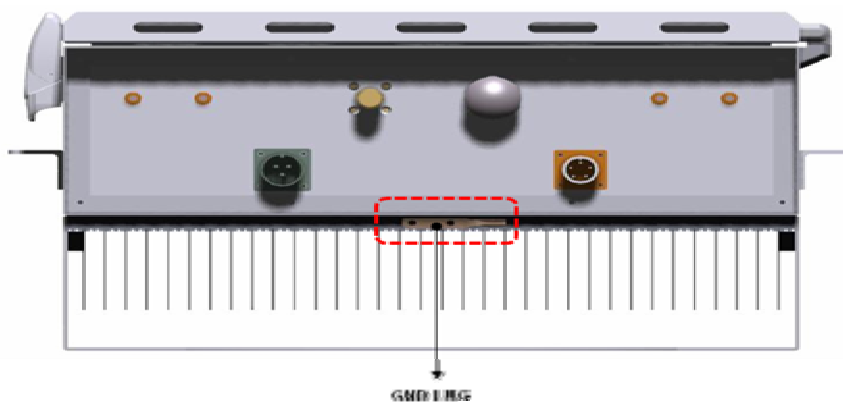
Optical cables should be inserted into Optic Port outside of ROU. Using an optical slack devices in ROU, you need to coil around one or two roll of cables to be connected with the optical adaptor of ROPTIC.

At this time, curvature of the optical cable should be at least  $10\varnothing$  to prevent insertion loss from being increased.

Through GUI, check if PD value of ROPTIC is in a tolerable range (+4~-1dBm).

### 5.3.4 GND Terminal Connection

ROU has one GND terminal port where is on bottom side, like below



- Take off the GND terminal port from enclosure and connect to ground cable, then fix it the position of enclosure again
- The opposite end of the ground cable should connect to the communication GND of building
- The ground lug is designed meeting the SQ5.5 standard

### 5.3.5 Coaxial cable and Antenna Connection

- The coaxial cables which are connected to antenna distributed network connect to antenna port of ROU. Before connection, check the VSWR value of coaxial cable whether it is within specification using SITEMASTER .
- At this time, check if the Return loss have above 15Db or VSWR have below 1.5
- The part of antenna connection fasten to port not to be loosed and not to be injected the dusty and insects
- The antenna connected to ROU is only serviced in inbuilding

### 5.3.6 Insertion of RDU

ROU has slots to enable up to three RDU modules to be inserted into the unit.

You can insert a RDU into any slot. It is not possible to provide services with a RDU module alone; you need to connect the module with Cavity BPF in any case.

The table below shows types of RDU and CAVITY BPF:

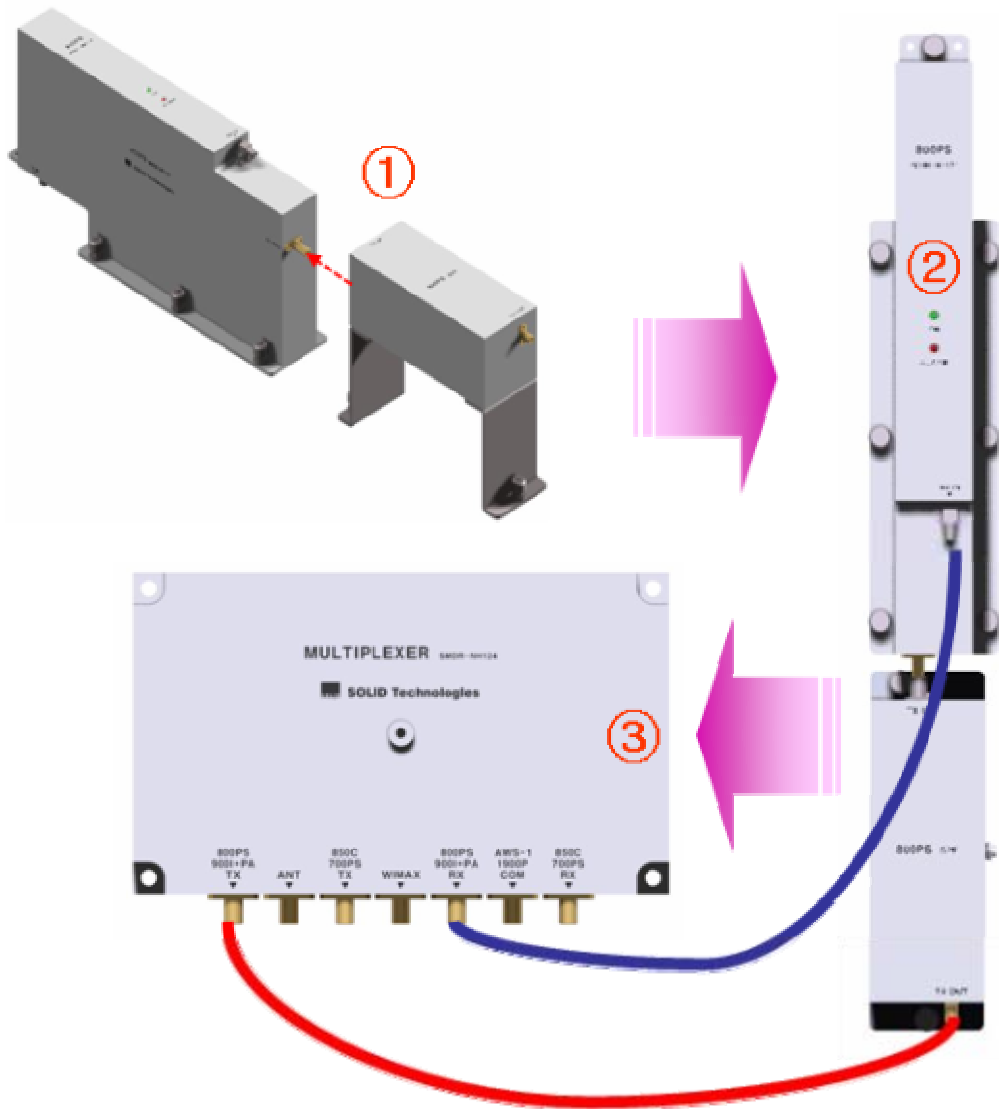
No	Unit naming	Cavity BPF	RF CABLE	Multiplexer Interface	
				TX	RX
1	RDU 800PS	800PS BPF	TX CABLE 1EA RX CABLE 1EA	BPF OUT	RDM RX IN
2	RDU 850C	850C BPF	TX CABLE 1EA RX CABLE 1EA	BPF TX OUT	BPF RX IN
3	RDU 1900P+AWS-1	1900P DUP	TX/RX CABLE 1EA	RDM AWS+1900P	
5	RDU 800PS+900I+PA	800PS+900I+PA BPF	TX CABLE 1EA RX CABLE 1EA	RDM TX OUT	RDM RX IN
6	RDU 850C+700PS	850C+700PS BPF	TX CABLE 1EA RX CABLE 1EA	RDM TX OUT	RDM RX IN
7	RDU VHF+UHF	-	TX CABLE 1EA RX CABLE 1EA	-	-
8	RDU 850C+700LTEC	850C+700LTEC BPF	TX CABLE 1EA RX CABLE 1EA	RDM TX OUT	RDM RX IN

The following describes how to install RDU in ROU.

### How to install RDU 800PS Ass'y

The following components are required:

No.	Unit	Description	Remark
1	RDU 800PS	RF Module	
2	800PS BPF	BPF	
3	800PS TX RF CABLE	SMA(M) to SMA(M), 360mm	
4	800PS RX RF CABLE	SMA(M) to SMA(M), 410mm	



- ① Combine RDU 800PS with 800PS BPF (As it is a plug type, push the unit to combine with BPF.)
- ② Insert the combined 800PS+850C BPF Ass'y into any slot of ROU.
- ③ Combination point of 800PS+800PS BPF Ass'y of the multiplexer

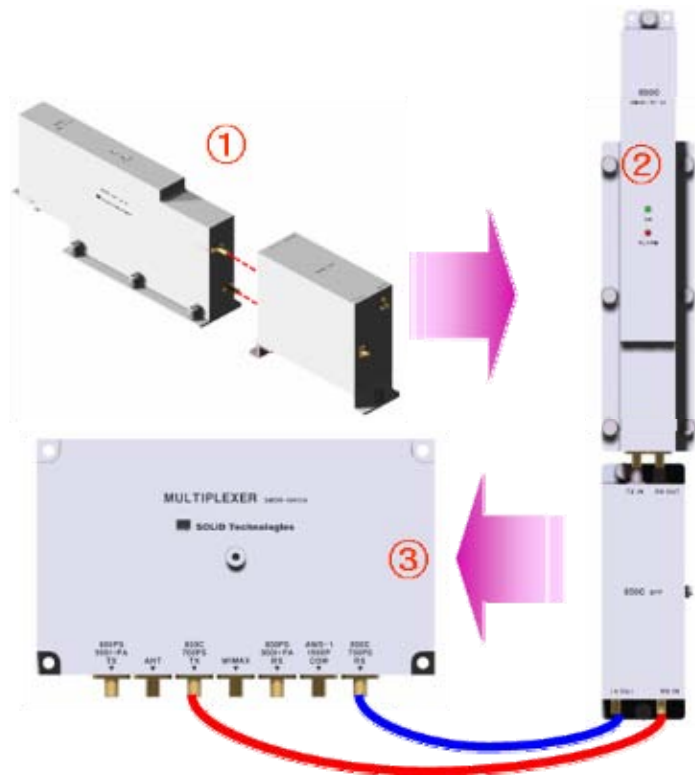
Multiplexer Port naming	Interface Point		Remark
	800PS RDU	800PS BPF	
800PS+900I+PA TX	-	TX OUT	
800PS+900I+PA RX	RX IN	-	



## How to RDU install 850C Ass'y

The following components are required:

No.	Unit	Description	Remark
1	RDU 850C	RF Module	
2	850C BPF	BPF	
3	850C TX RF CABLE	SMA(M) to SMA(M), 310mm	
4	850C RX RF CABLE	SMA(M) to SMA(M), 310mm	



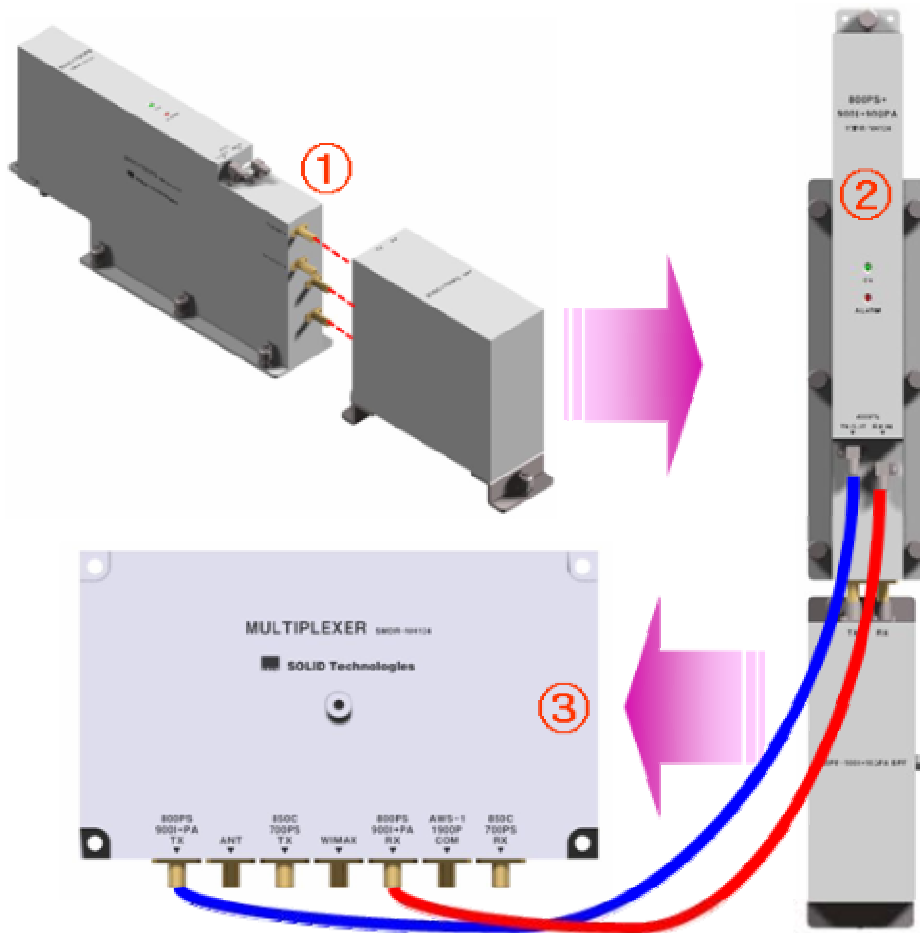
- ① Combine 850C RDU with 850C BPF (As it is a plug type, push the unit to combine with BPF.)
- ② Insert the combined 850C+850C BPF Ass'y into any slot of ROU.
- ③ Combination point of 850C+850C BPF Ass'y of the multiplexer

Multiplexer Port naming	Interface Point		Remark
	850C RDU	850C BPF	
850C TX	-	TX OUT	
850C RX	-	RX IN	

## How to install RDU 800PS+900I+PA Ass'y

The following components are required:

No.	Unit	Description	Remark
1	RDU 800PS+900I+PA	RF Module	
2	800PS+900I+PA BPF	BPF	
3	800PS+900I+PA TX RF CABLE	SMA(M) to SMA(M), 460mm	
4	800PS+900I+PA RX RF CABLE	SMA(M) to SMA(M), 380mm	



- ① Combine RDU 800PS+900I+PA with 800PS+900I+PA BPF (As it is a plug type, push the unit to combine with BPF.)
- ② Insert the combined 800PS+900I+PA BPF Ass'y into any slot of ROU.
- ③ Combination point of 800PS+900I+PA BPF Ass'y of the multiplexer

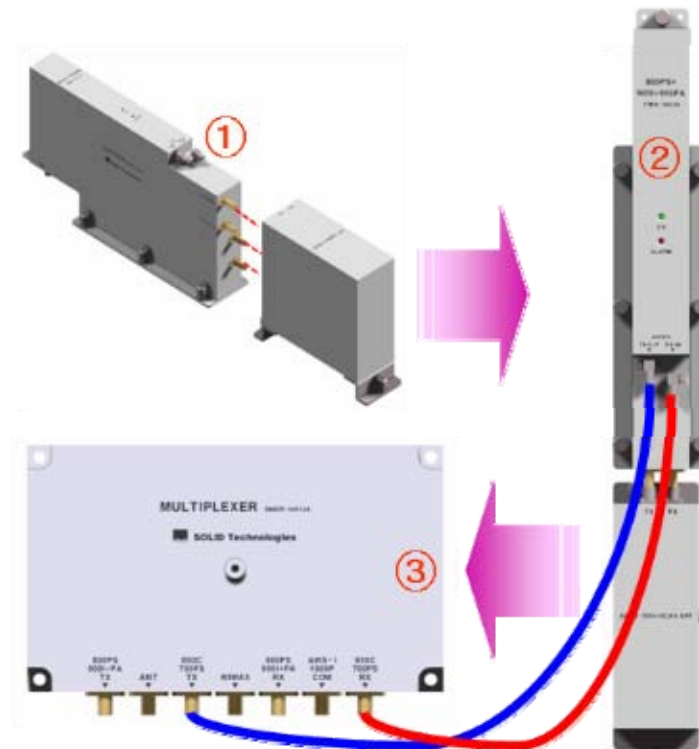
Multiplexer Port naming	Interface Point		Remark
	800PS+900I+PA RDU	800PS+900I+PA BPF	

800PS+900I+PA TX	TX OUT	-	
800PS+900I+PA RX	RX IN	-	

### How to install RDU 850C+700PS Ass'y

The following components are required:

No.	Unit	Description	Remark
1	RDU 850C+700PS	RF Module	
2	850C+700PS BPF	BPF	
3	850C+700PS TX RF CABLE	SMA(M) to SMA(M), 470mm	
4	850C+700PS RX RF CABLE	SMA(M) to SMA(M), 400mm	



- ① Combine RDU 850C+700PS with 850C+700PS BPF (As it is a plug type, push the unit to combine with BPF.)
- ② Insert the combined 850C+700PS BPF Ass'y into any slot of ROU.
- ③ Combination point of 850C+700PS BPF Ass'y of the multiplexer

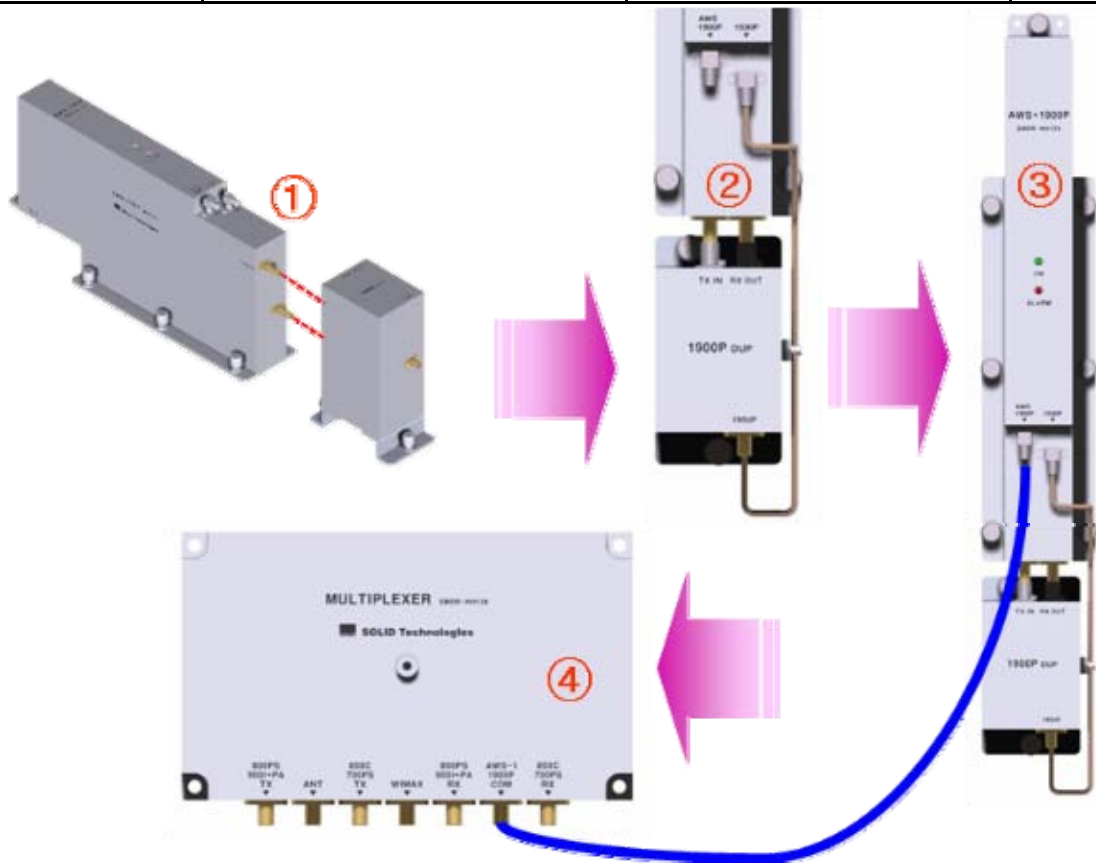
Multiplexer Port naming	Interface Point		Remark
	850C+700PS RDU	850C+700PS BPF	
850C+700PS TX	TX OUT	-	

850C+700PS RX	RX IN	-	
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### How to install RDU 1900P+AWS-1 Ass'y

The following components are required:

No.	Unit	Description	Remark
1	RDU 1900P+AWS-1	RF Module	
2	1900P+AWS-1 BPF	BPF	
3	1900P+AWS-1 RF CABLE	SMA(M) to SMA(M), 390mm	
4	1900P+AWS-1 RF-01	SMA(M) to SMA(M)	Semirigid



- ① Combine RDU 1900P+AWS-1 with 1900P BPF (As it is a plug type, push the unit to combine with BPF.)
- ② Connect BPF 1900P port with 1900P port of 1900P RDU through 1900P+AWS-1 RF-01 RF CABLE.
- ③ Insert the combined 1900P+AWS-1 BPF Ass'y into any slot of ROU.
- ④ Combination point of 1900P+AWS-1 BPF Ass'y of the multiplexer

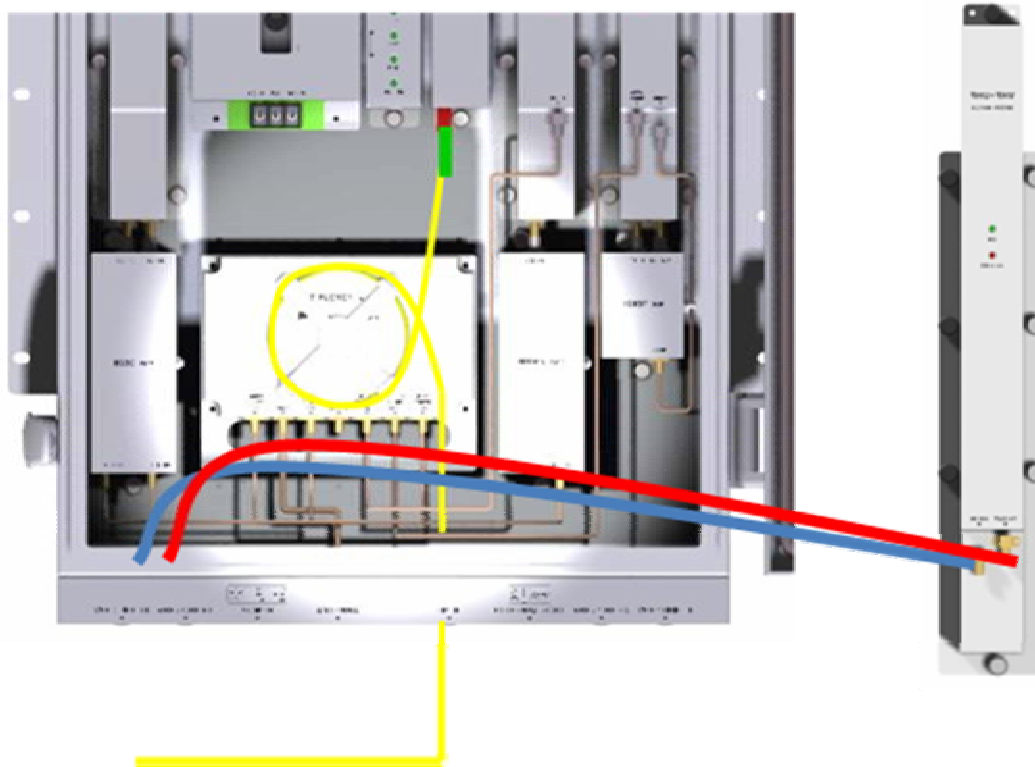
Multiplexer Port naming	Interface Point	Remark
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	<b>1900P+AWS-1 RDU</b>	<b>1900P BPF</b>	
AWS-1+1900P COM	1900P+AWS	-	

### How to install RDU VHF+UHF Ass'y

The following components are required:

No.	Unit	Description	Remark
1	RDU VHF+UHF	RF Module	
2	RDU VHF+UHF RF CABLE	SMA(M) to SMA(M), 460mm	
3	RDU VHF+UHF RF CABLE	SMA(M) to SMA(M), 380mm	



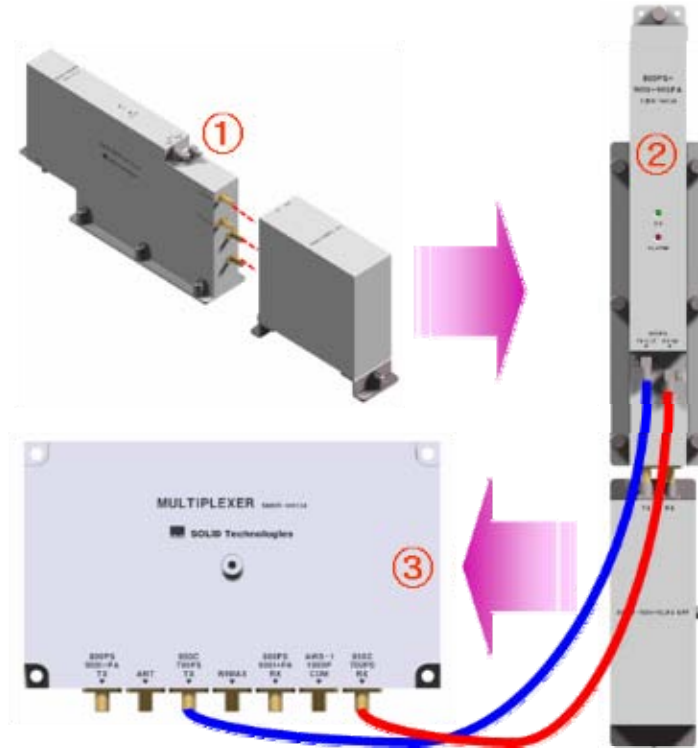
- ① Insert the combined VHF+UHF RDU into any slot of ROU.
- ② Connect RDU VHF+UHF Port with ROU VHF+UHF Port through VHF+UHF RF CABLE

### How to install RDU 850C+700LTEC Ass'y

The following components are required:

No.	Unit	Description	Remark
1	RDU 850C+700LTEC	RF Module	
2	850C+700PS BPF	BPF	
3	850C+700PS TX RF CABLE	SMA(M) to SMA(M), 470mm	

4	850C+700PS RX RF CABLE	SMA(M) to SMA(M), 400mm	
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- ① Combine RDU 850C+700 LTEC with 850C+700PS BPF (As it is a plug type, push the unit to combine with BPF.)
- ② Insert the combined 850C+700 LTEC BPF Ass'y into any slot of ROU.
- ③ Combination point of 850C+700PS/700LTE BPF Ass'y of the multiplexer

Multiplexer Port naming	Interface Point		Remark
	850C+700LTEC RDU	850C+700PS BPF	
850C+700PS TX	TX OUT	-	
850C+700PS RX	RX IN	-	



You cannot insert the same module and band into MULTIPLEXER port at the same time.

For example, you are not supposed to insert both of 800PS RDU and 800PS+900I+PA RDU into ROU at the same time. In the same way, you cannot concurrently insert both of 850C RDU , 850C+700PS RDU and 850C+700LTEC into ROU.

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### **Information of LED at the front RDU**

RDU has the structure of enabling a random RDU to be inserted into three slots.  
ROU can be equipped with a total of three RDUs. If only one RDU is inserted into a slot

and the other slots remain reserved, you need to insert BLANK cards into the other slots.

When RDU is inserted into ROU, LED of the front panel shows the following information:



LED		Description
ON	● (Grey)	Power is not supplied
	● (Green)	Power is supplied.
ALM	● (Green)	Normal Operation
	● (Red)	Abnormal Operation





Up to three RDUs can be inserted. If one or two units of them are used, then you need to terminate the unused slot of RDU with a BLANK card.

### 5.3.7 Consumption of RDU

The following table shows power consumption of RDU:

Part	Unit	Consumption Power		Remark
Common Part	Enclosure	17W		
	RCPU			
	ROPTIC			
	RPSU			
	Multiplexer			
RDU	RDU 800PS	39W		
	RDU 800PS+900I+Paging	800PS	49W	900I+PA HPA OFF
		900I+PA	72W	800PS HPA OFF
		FULL	79W	Both HPA ON
	RDU 850C	39W		
	RDU 850C+700PS	850C	49W	700PS HPA OFF
700PS		58W	850C HPA OFF	

		FULL	93W	Both HPA ON
	RDU 1900P+AWS-1	1900P	46W	AWS-1 HPA OFF
		AWS-1	46W	1900P HPA OFF
		FULL	68W	Both HPA ON
	RDU VHF+UHF	VHF	47W	VHF HPA OFF
		UHF	47W	UHF HPA OFF
		FULL	74W	Both HPA ON

For power consumption of ROU, the common part consumes 17W. Depending on the quantity of each RDU, you can add overall power consumption of ROU. Only, in case of Dual-Band signals, power consumption is calculated respectively when HPA of the other party is turned OFF and two HPA devices are turned ON. Note that when you calculate Power Budget.

## 5.4 OEU Installation

OEU is used to expand ROU in Campus Site.

OEU is located at a Remote Closet. As it can be equipped with up to two DOUs, you can expand a total of eight ROUs.

### 5.4.1 OEU Shelf installation

OEU is a shelf in around 2U size. Its width is 19" and so this unit should be inserted into a 19" Standard Rack. OEU is in a Remote Closet, providing optical ports of ROU.

The following table shows power consumption of OEU:

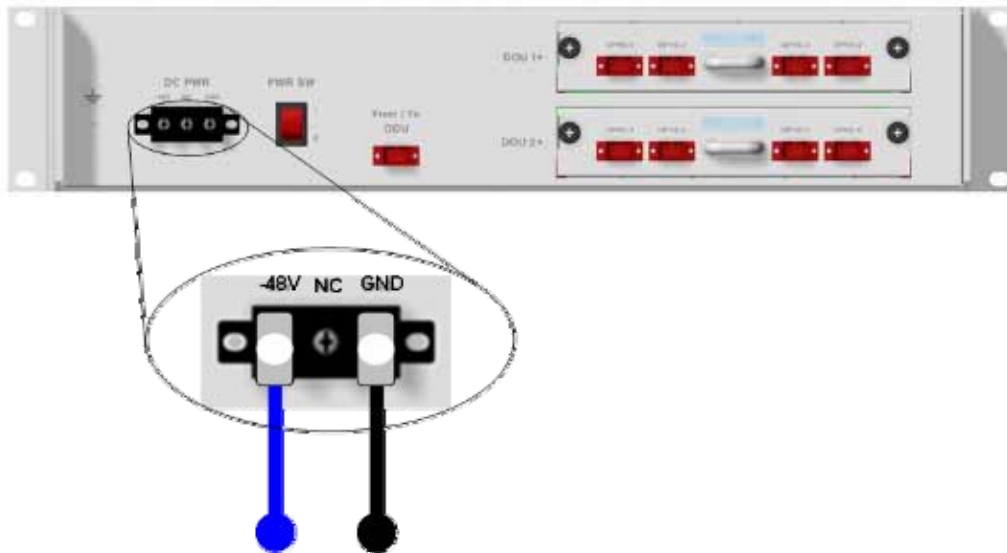
No.	Unit	Description	Remark
Common Part	Shelf	Including EWDM,ERF,EPSU,ECPU, 19",2U	1EA
	Power Cable	-48Vdc Input with two lug terminal	1EA
Optional Part	DOU	Optical Module with 4 Optic Port	Up to 2EA to be inserted

### 5.4.2 OEU Power Cabling

The input power of OEU is DC -48V. You need to connect DC cable with the Terminal Block seen at the rear of OEU.

Terminal	Color of cable	Description	Remark
-48V	Blue color	Input range: -42 ~ -56Vdc	
NC	Not Connected		
GND	Black color		

Before connecting the power terminal, you need to connect “+” terminal of Multi Voltage Meter probe with the GND terminal and then connect “-“ terminal with -48V to see if “-48Vdc” voltage is measured. After the check, connect the power terminal through the terminal seen below.





Note that OEU does not operate if the “+” terminal and the “-” terminal of the -48V power are not inserted into the accurate polarity.

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### 5.4.3 OEU Optic Cabling

OEU is connected with upper ODU. With DOU inserted in it, the unit is connected with ROU. As OEU has a shelf with EWDM in it, the unit makes electronic-optical conversion of TX signals from ODU and makes optical-electronic conversion of RX signals. In addition, OEU can be equipped with up to two DOUs. One DOU supports four optical ports and one optical port can be connected with ROU. With WDM in DOU, the unit can concurrently send/receive two pieces of wavelength (TX:1310nm, RX:1550nm) through one optical core. DOU has SC/APC of optical adaptor type.



**Figure 5.7 – Optical cable of SC/APC Type**

For optical adaptor, SC/APC type should be used. To prevent the optical access part from being

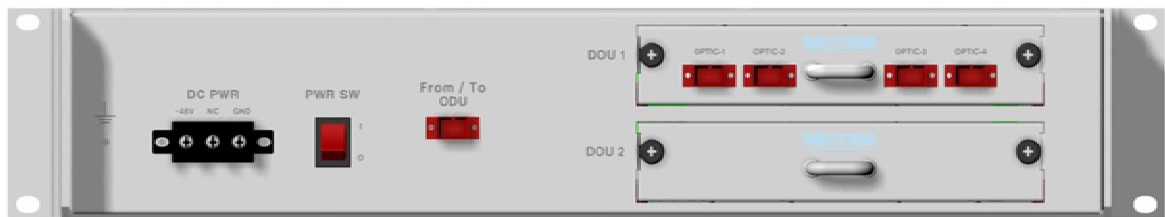
marred with dirt, it should be covered with a cap during move. When devices are connected through optical cables, you need to clear them using alcohol to remove dirt.

#### 5.4.4 Insert DOU to OEU

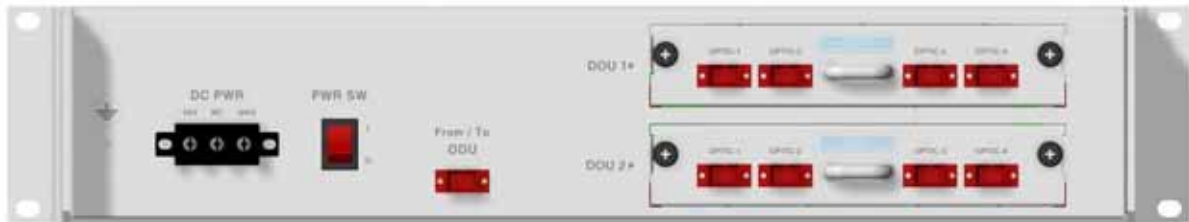
Into OEU Shelf, up to two DOUs can be inserted. DOU module is in Plug in Play type.

When you insert DOU in OEU, insert the unit into the top DOU1 slot first. You can be careful as the number is silk printed at the left.

The following figure shows installation diagram of OEU with one DOU inserted in it.



The following figure shows installation diagram of OEU with two DOUs inserted in it.



When you insert DOU into OEU, insert the unit into the top DOU1 first. For unused slots,

you need to install BLANK UNIT into them.

#### 5.4.5 Consumption Power of OEU

OEU has -48V DC Power supply in it. ODU can be equipped with up to two DOUs. Depending on the quantity of DOU, power consumption is varied.

The following table shows power consumption of OEU:

Part	Unit	Consumption Power	Remark
Common Part	Shelf	12W	
	EWDM		
	ERF		
	EPSU		
OEU_4	DOU 1 EA	23W	
OEU_8	DOU 2 EA	33W	

### 5.5 ADD ON V/UHF ROU Installation

#### 5.5.1 AOR Enclosure installation

AOR 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 NEMA4 like existing ROU

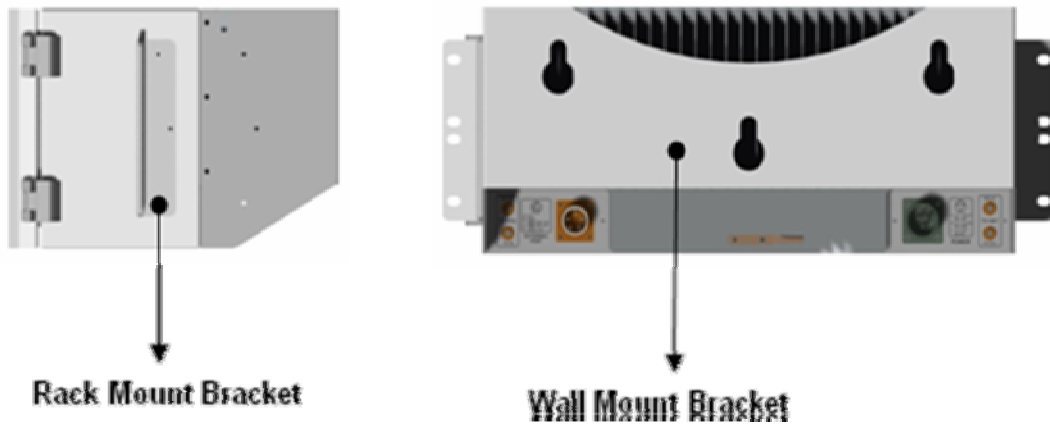
AOR can be mounted into either of a 19" Standard Rack or on a Wall.

Basically, AOR has both of a Wall Mount Bracket and a Rack Mount Bracket.

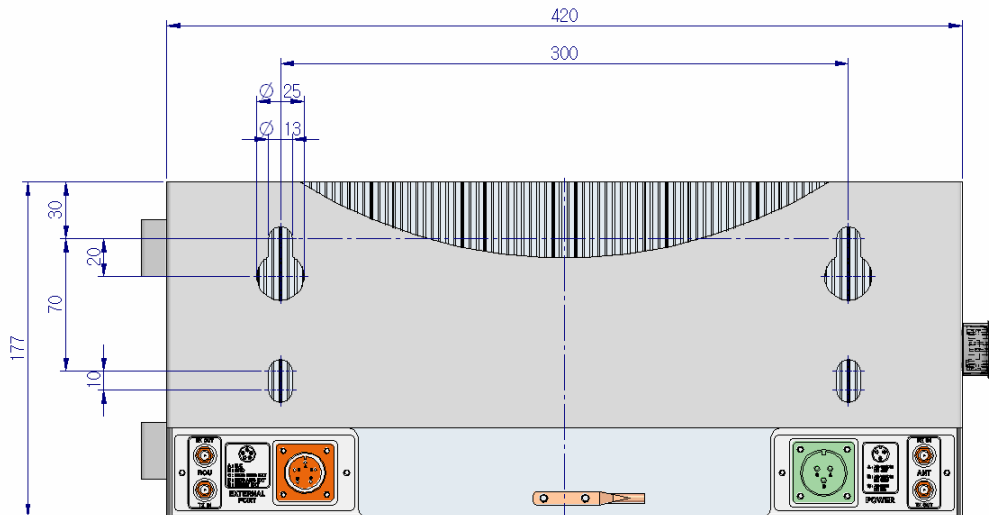
Depending on the usage the Rack Mount Bracket or the Wall bracket can be removed.

The following shows dimension of the fixing point for the Wall Mount Bracket.

AOR should be installed above or under of existng ROU



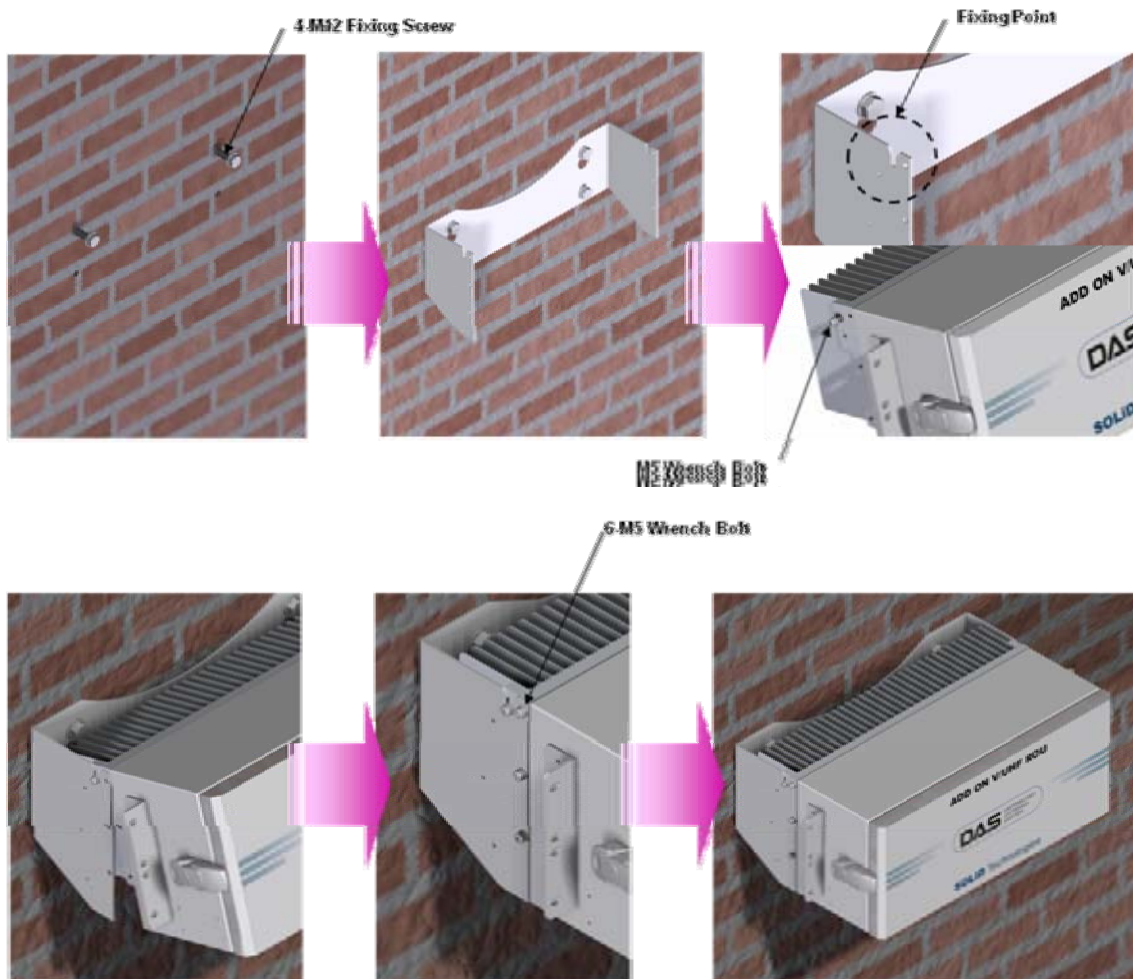
**Figure 5.8 – How to install AOR**



**Figure 5.9 – Dimension used to install AOR on the WALL**

## ROU Wall Mount Installation

Turn M12 Fixing Screws by half on the wall and fully fix the screw with a Wall Mount Bracket on it. For convenience, the Wall Mount Bracket has fixing holes to let you easily mount an enclosure. Turn the M5 Wrench Bolt by half at each side of the Heatsink of the enclosure.



**Figure 5.10 – Installation flow diagram when AOR installs on wall**

Put the enclosure with the M5 Wrench Bolt fixed on the fixing groove and fix the M5 Wrench Bolts into the remaining fixing holes.

In this case, you will use 6EA of M5 Wrench Bolts in total except bolts used for the fixing groove.

### **ROU Rack Mount Installation**

Like other units, AOR is designed to be inserted into a rack. The unit occupies about 4U of space except cable connection.

In case that AOR is installed more close above/below existing ROU, temperature of ROU/AOR increase ambient temperature, which increase ambient of AOR/ROU's.



temperature is increased. Therefore, we recommend that AOR should be installed with at least constant space from existing ROU(above 2U)

The following shows the installed diagram on rack with existing ROU

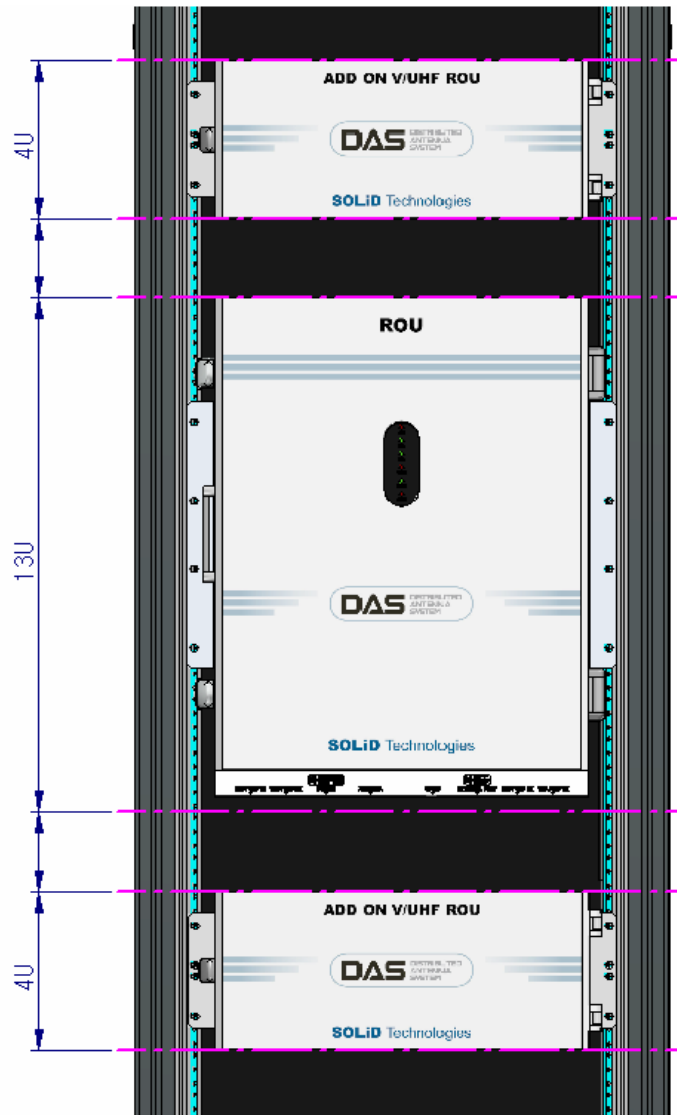


Figure 5.10 – Installation flow diagram when AOR installs in the rack

### AOR components

AOR has the following components:

No.	Unit	Description	Remark
Common Part	Enclosure	Including Rack & Wall bracket	1EA
	AOR PSU	Alternative DC-48V or AC 120V	1EA
	V/UHF RDU	-	1EA