ADXV-R-25VU-U2 + ADXV-R-3378P-U2 User Manual_Additional PSR-ANN-U2

Version 0.1

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Change List

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Terms and Abbreviations

The following is a list of abbreviations and terms used throughout this document.

Abbreviation/Term	Definition
AGC	Automatic Gain Control
ALC	Automatic Level Control
AROMS	ADRF Repeater Operation and Management System
BCU	Band Combiner Unit
BTS	Base Transceiver Station
BDA	Bi-directional Amplifier
CDMA	Code Division Multiple Access
CHC	Channel combiner
CW	Continuous Wave (un-modulated signal)
DAS	Distributed Antenna System
DL	Downlink
Downlink	The path covered from the Base Transceiver Station (BTS) to the subscribers' service area via the repeater
HE	Head End
HPA	High Power Amplifier
HW	Hardware
IF	Intermediate Frequency
LNA	Low Noise Amplifier
LTE	Long Term Evolution
MS	Mobile Station
NMS	Network Management System
ODU	Optical Donor Unit which is located in ADXV-HE.
OEU	Optic Expansion Unit
PLL	Phased Locked Loop
POI	Point of Interface
PSU	Power Supply Unit
RF	Radio Frequency
RU	Remote Unit which is composed of master RU and multiple slaves RU
RM	Remote Module
SW	Software
UL	Uplink
Uplink	The path covered from the subscribers' service area to the Base Transceiver Station (BTS) via the repeater
VSWR	Voltage Standing Wave Ratio

1. INTRODUCTION

The optical signal is distributed to multiple ADXV-R-25VU-U2 remote units where the optical signal is converted back to RF and amplified. The amplified signal is then connected to server antennas at the coverage locations.

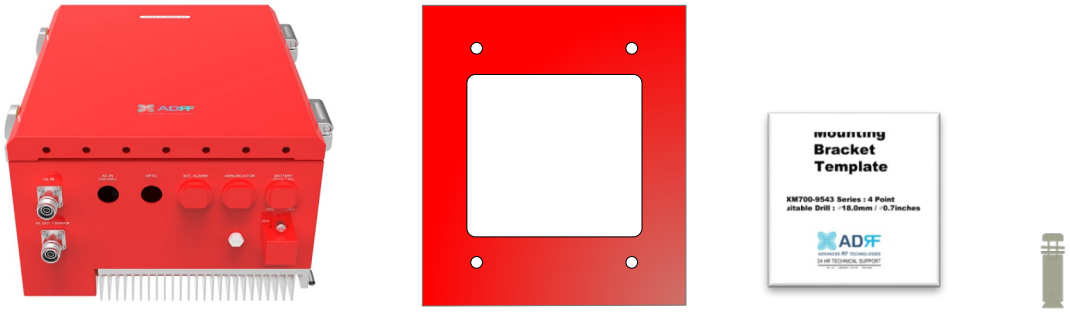
1.1 Highlights

- ADXV-R-25VU-U2 and Headend supporting VHF/UHF Public Safety bands in one body
- Passive Fanless Cooling
- Air convection cooling without fans
- Web-based GUI Interface; No 3rd party GUI software is required
- Web-GUI connectivity via DHCP in host mode
- programmable Alarm Function supporting dry contacts

1.2 ADXV-R-25VU-U2 Parts List

Table 1-1 Parts List

Label	Quantity	Description
A	1	ADXV-25VU-U2
B	1	Wall Mount Bracket
C	1	Mounting Bracket Template
D	6	Anchor Bolt



A B C D

Figure 1-1 ADXV-R-25VU-U2 Parts List

The ADXV-R-25VU-U2 can support up to (2) PSR-ANN-U2 annunciators, however, they must be purchased separately. The ADXV-R-25VU-U2 can also support AAI dry contact alarming at the remote unit, however, the alarming cable much be purchased separately.

1.3 ADXV-R-25VU-U2 Quick View

Figure 1-2 ADXV-R-25VU-U2 Quick View (Bottom)

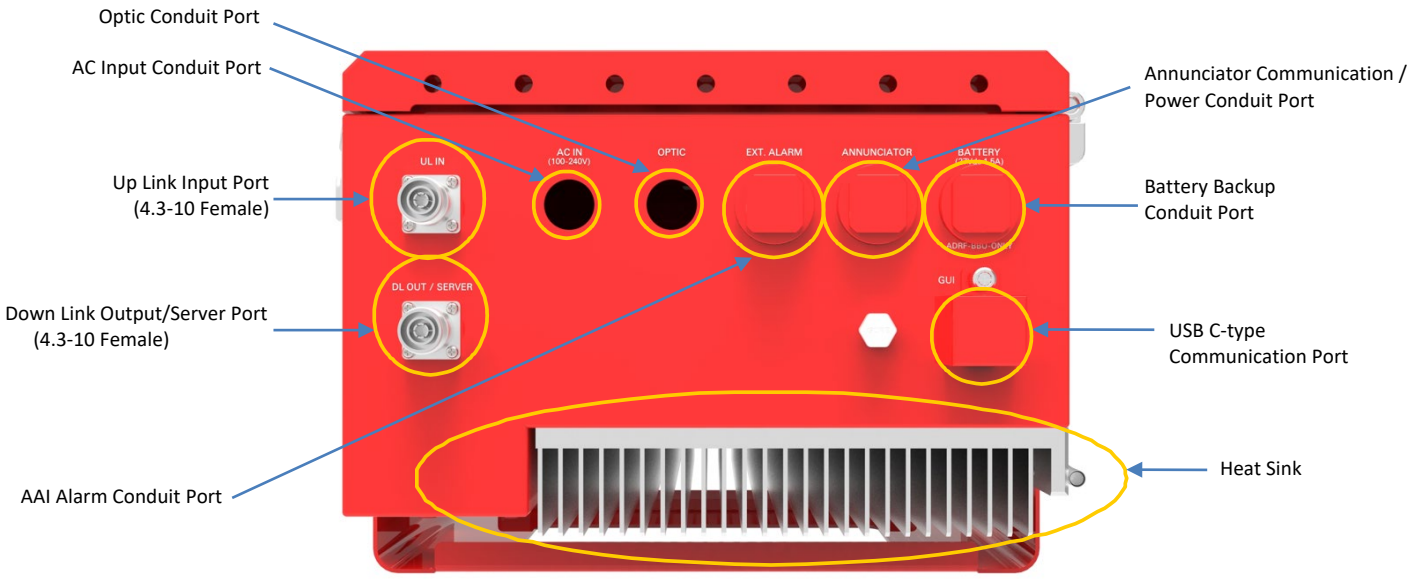


Figure 1-2 ADXV-R-25VU-U2 Quick View (front and bottom)

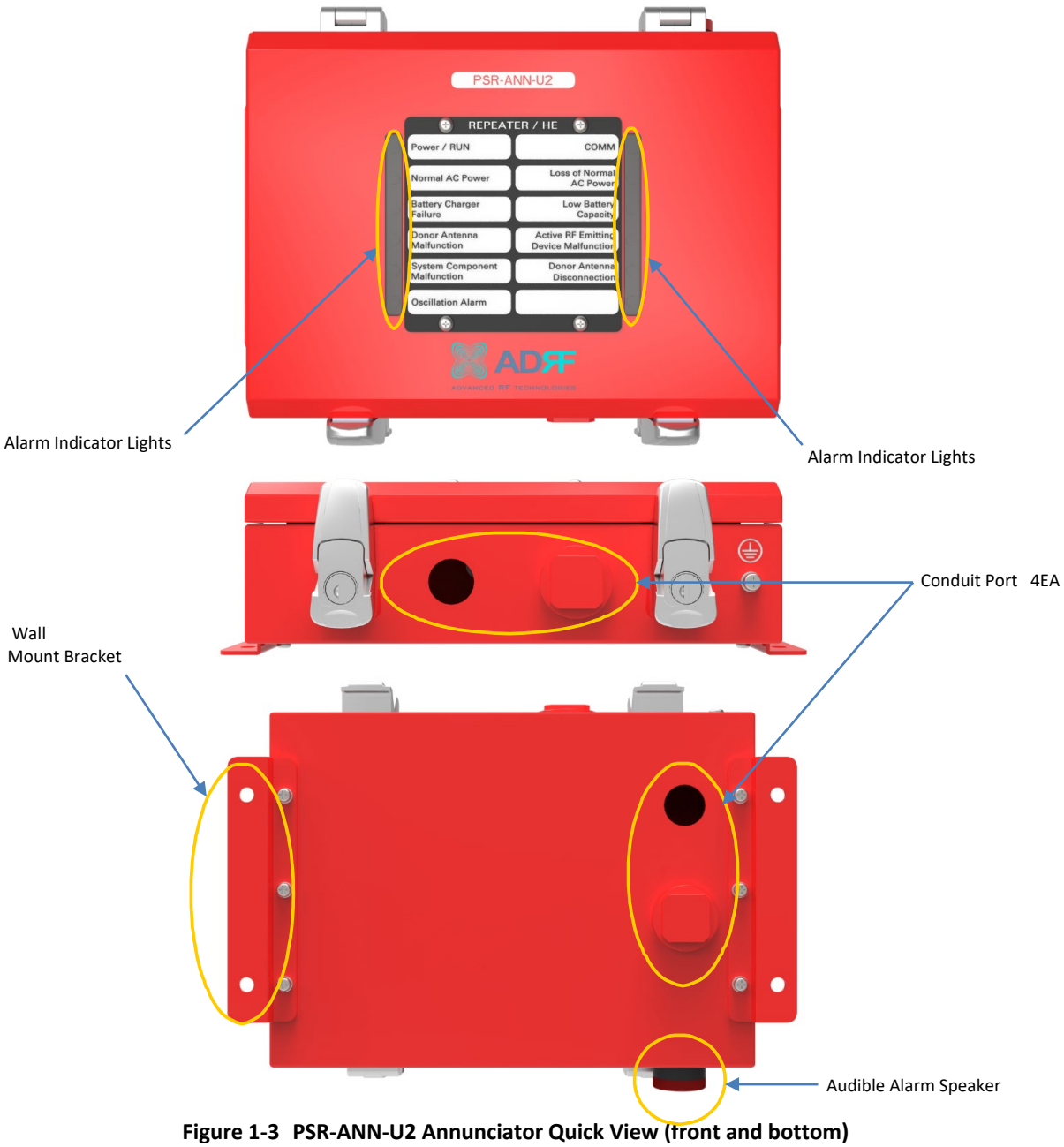


Figure 1-3 PSR-ANN-U2 Annunciator Quick View (front and bottom)

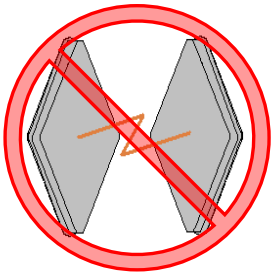
1.3.1 ADXV-R-25VU-U2 Ports

- **OPTIC**: Conduit hole which is to be used for the optic cables for remote units.
- **AC 100~240V**: Conduit hole for AC power line.
- **BATTERY**: Conduit hole for DC power battery backup line.
- **UL IN**: 4.3-10 female connector where the Server antenna is connected.
- **DL OUT/SERVER**: 4.3-10 female connector where the Server antenna is connected.
- **ANNUNCIATOR**: Conduit hole for the PSR-ANN-U2 line.
- **Ext. ALARM**: Connector for the AAI dry contact alarming for the ADXV-R-25VU-U2 alarms.
- **GUI**: USB C-type Communication.

1.4 Warnings and Hazards

WARNING! ELECTRIC SHOCK

Opening the ADXV-R-25VU-U2, ADXV-R-3378P-U2 could result in electric shock and may cause severe injury.



WARNING! DAMAGE TO REPEATER

Operating the ADXV-R-25VU-U2, ADXV-R-3378P-U2 with antennas in very close proximity facing each other could lead to severe damage to the repeater.

WARRANTY

Opening or tampering ADXV-R-25VU-U2, ADXV-R-3378P-U2 will void all warranties.

Lithium Battery: CAUTION. RISK OF EXPLOSION IF BATTERY IS REPLACED BY INCORRECT TYPE. DISPOSE OF USED BATTERIES ACCORDING TO INSTRUCTIONS.

Ethernet Instructions: This equipment is for indoor use only. All cabling should be limited to inside the building. Ethernet connection can only be used for programming/troubleshooting purposes only and is not to be connected during normal operation. If an Ethernet cable is connected to this port during normal operation, then the cable must not exceed 30 meters.

Preclude indications that Home/ personal use are prohibited.

Use of unauthorized antennas, cables, and/or coupling devices not conforming with ERP/EIRP is prohibited.

FCC Part 15.21

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

FCC Part 15.19

The 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 Part 15 Class A

NOTE: 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 their own expense.

RF Radiation Exposure

FCC RF Radiation Exposure Statement:
This equipment complies with FCC RF radiation exposure limits set forth for an uncontrolled environment. This equipment should be installed and operated with a minimum distance of 30 cm between the radiator and your body. This transmitter must not be co-located or operating in conjunction with any other antenna or transmitter.
(DL: Omni-Directional Antenna Max. peak gain:UHF(1.8 dBi), VHF(2.0 dBi))

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 30 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.
(DL: Omni-Directional Antenna Max. peak gain:UHF(1.8 dBi), VHF(2.0 dBi))

L'antenne (ou les antennes) doit être installée de façon à maintenir à tout instant une distance minimum de au moins 30 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.
(DL: Omni-directionnelle Antenne Gain maximal de crête : UHF(1.8 dBi), VHF(2.0 dBi))

◈LABEL WARNING◈

Part 90 Signal Boosters This is A 90.219 CLASS A DEVICE

WARNING. THIS is NOT a CONSUMER device. It is designed for installation by FCC LICENSEES and QUALIFIED INSTALLERS. You MUST have an FCC LICENSE or express consent of an FCC Licensee to operate this device. You MUST register Class B signal boosters (as defined in 47 CFR 90.219) online at www.fcc.gov/signal-boosters/registration. Unauthorized use may result in significant forfeiture penalties, including penalties in excess of $100,000 for each continuing violation.

Power Reduction Warning Statement

This 3.5dB back off is only required when multiple carriers are present in the pass-band.

CAUTION: Double pole, neutral fusing. Disconnect mains before servicing

Attention : bipolaire, fusible neutre. Débranchez le secteur avant l'entretien.

2. CABLE CONNECTION & INSTALLATION

2.1 ADXV-R-25VU-U2 Wiring Compartment

The bottom of the ADXV-R-25VU-U2 is a wiring compartment with pre-cut holes. These holes are designed to be used in conjunction with conduit hubs to prevent water ingress. A total of 5 pre-cut holes are available to use for the various cables that will be needed for the proper operation of the ADXV-R-25VU-U2.
To maintain UL 2524 Listed status, unused ports must be properly weatherproofed.

Table 3-1 Pre-cut hole size and labels

Silkscreen Label	Location	Diameter
AC 100-240V	BOTTOM	22.2mm (7/8”)
ANNUNCIATOR	BOTTOM	22.2mm (7/8”)
BATTERY	BOTTOM	22.2mm (7/8”)
OPTIC	BOTTOM	22.2mm (7/8”)
EXT.ALARM	BOTTOM	22.2mm (7/8”)

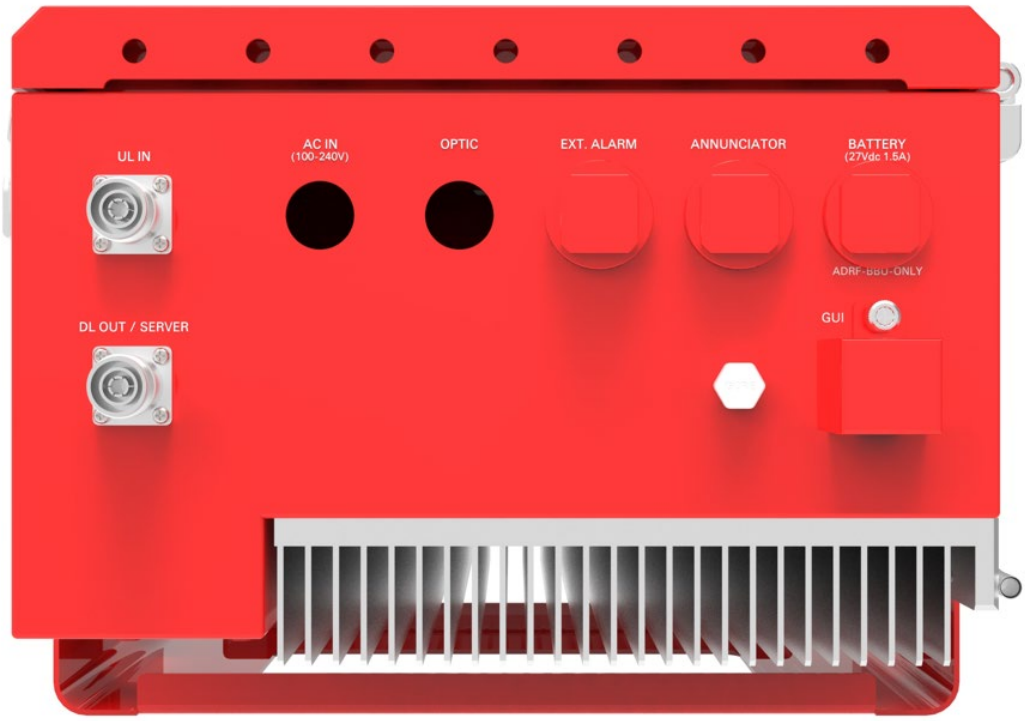


Figure 3-1 Wiring Compartment Cutout Holes

2.1.1 Wire Terminals

Red is the AC power line and DC battery line is blue. Yellow is the Optic line and black is the Alarm line

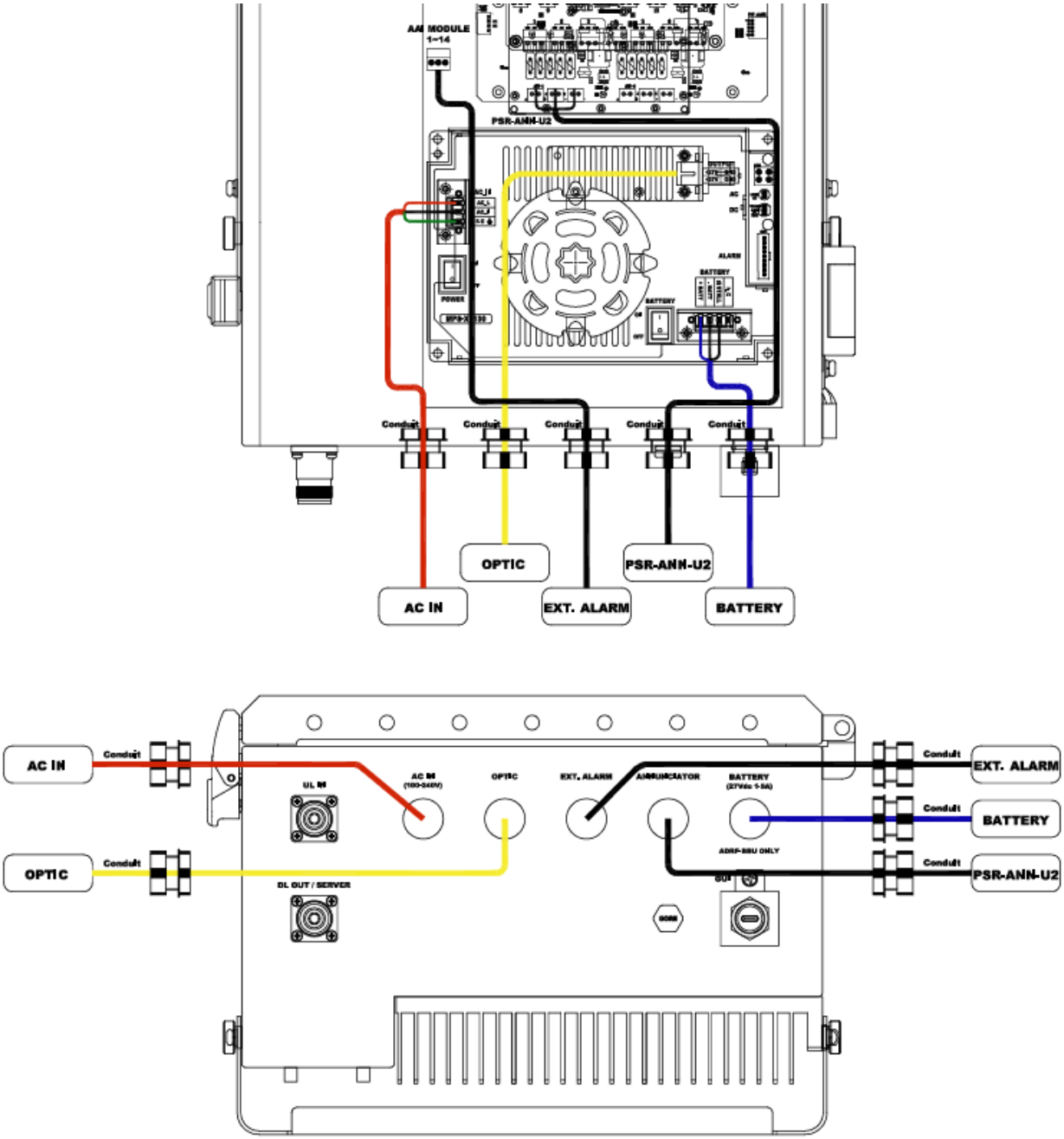


Figure 3-2 ADXV-R-25VU-U2 Terminal Wiring Diagram

2.1.2 AC 100-240V Terminal Block

The AC 100-240V terminal block is located on the left side of the wiring room. It is fixed to the terminal block on the power supply. It can support cable gauges up to 14 AWG.

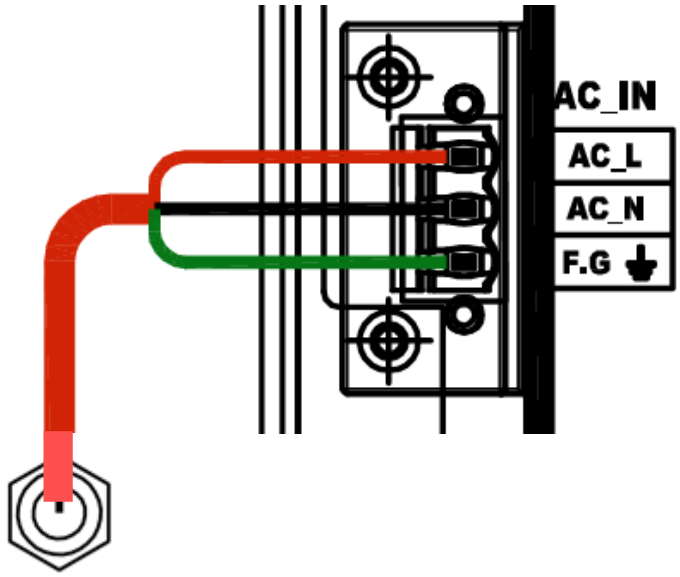


Figure 3-3 AC 100-240V Terminal Block

Table 3-2 120V AC Terminal Block Definition

Silkscreen Label	Line Type	Max Supported AWG	Comment
AC_L	Neutral	14AWG	
AC_N	Line or Hot	14AWG	
F.G	Ground	14AWG	

Table 3-3 240V AC Terminal Block Definition

Silkscreen Label	Line Type	Max Supported AWG	Comment
AC_L	Line or Hot	14AWG	
AC_N	Line or Hot	14AWG	
F.G	Ground	14AWG	

2.2 External Alarm

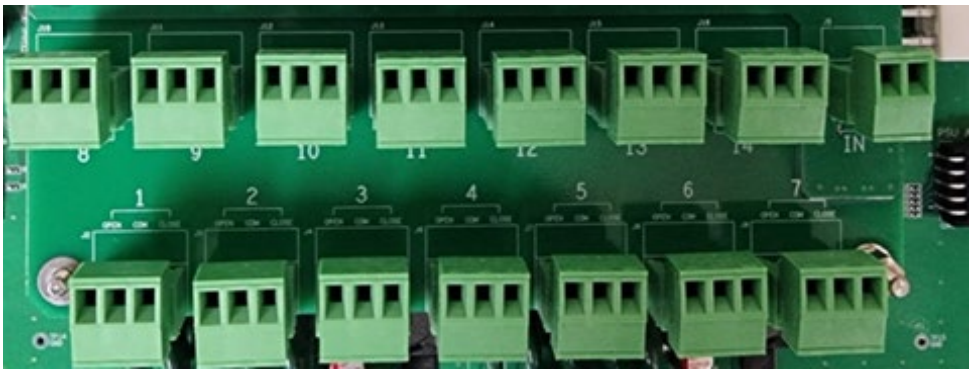


Figure 3-4 External Alarm port

This port is to be connected to the fire alarm control panel (FACP) and will provide the alarming status of the ADXV-R-25VU-U2. Can support cable gauges up to 14 AWG

Table 3-3 External Alarm Port Pin Description

AAI Number	Connector Pin Number	Alarm Description	Selection Pin Description
1	1	Donor antenna malfunction	OPEN
1	2	Donor antenna malfunction	COM
1	3	Donor antenna malfunction	CLOSE
2	1	Active RF device malfunction	OPEN
2	2	Active RF device malfunction	COM
2	3	Active RF device malfunction	CLOSE
3	1	Low battery capacity	OPEN
3	2	Low battery capacity	COM
3	3	Low battery capacity	CLOSE
4	1	System component malfunction	OPEN
4	2	System component malfunction	COM
4	3	System component malfunction	CLOSE
5	1	Normal AC Power	OPEN
5	2	Normal AC Power	COM
5	3	Normal AC Power	CLOSE
6	1	Loss of normal AC Power	OPEN
6	2	Loss of normal AC Power	COM
6	3	Loss of normal AC Power	CLOSE
7	1	Battery charger failure	OPEN
7	2	Battery charger failure	COM
7	3	Battery charger failure	CLOSE
8	1	Donor Antenna Disconnect	OPEN
8	2	Donor Antenna Disconnect	COM
8	3	Donor Antenna Disconnect	CLOSE
9	1	ANN Disconnection	OPEN
9	2	ANN Disconnection	COM
9	3	ANN Disconnection	CLOSE

10	1	Summary Alarm	OPEN
10	2	Summary Alarm	COM
10	3	Summary Alarm	CLOSE
11	1	Oscillation Alarm	OPEN
11	2	Oscillation Alarm	COM
11	3	Oscillation Alarm	CLOSE
12	1	AAI Alarm Spare 1	OPEN
12	2	AAI Alarm Spare 1	COM
12	3	AAI Alarm Spare 1	CLOSE
13	1	AAI Alarm Spare 2	OPEN
13	2	AAI Alarm Spare 2	COM
13	3	AAI Alarm Spare 2	CLOSE
14	1	AAI Alarm Spare 3	OPEN
14	2	AAI Alarm Spare 3	COM
14	3	AAI Alarm Spare 3	CLOSE

Normal Operation; For Open, connect signal lines to Open Pin and Com Pin; For Close, connect signal lines to Closed Pin and Com Pin.
Com pin is used in common and is selected between open and close pins.

2.3 UL IN

Figure 3-5 UL IN

The RF connector is a 4.3-10 female connector. The RF connector labeled "UL IN" should be connected to the server antenna in the coverage area when the MPLX is not in use.
RF connection shall be made via a cable with a characteristic impedance of 50 ohms.

2.4 DL OUT / SERVER

Figure 3-6 DL OUT / SERVER

The RF connector is a 4.3-10 female connector. When using a MPLX, an RF connector labeled "DL OUT/SERVER" must be connected to the server antenna in the coverage area.
RF connection shall be made via a cable with a characteristic impedance of 50 ohms.

2.5 Optic

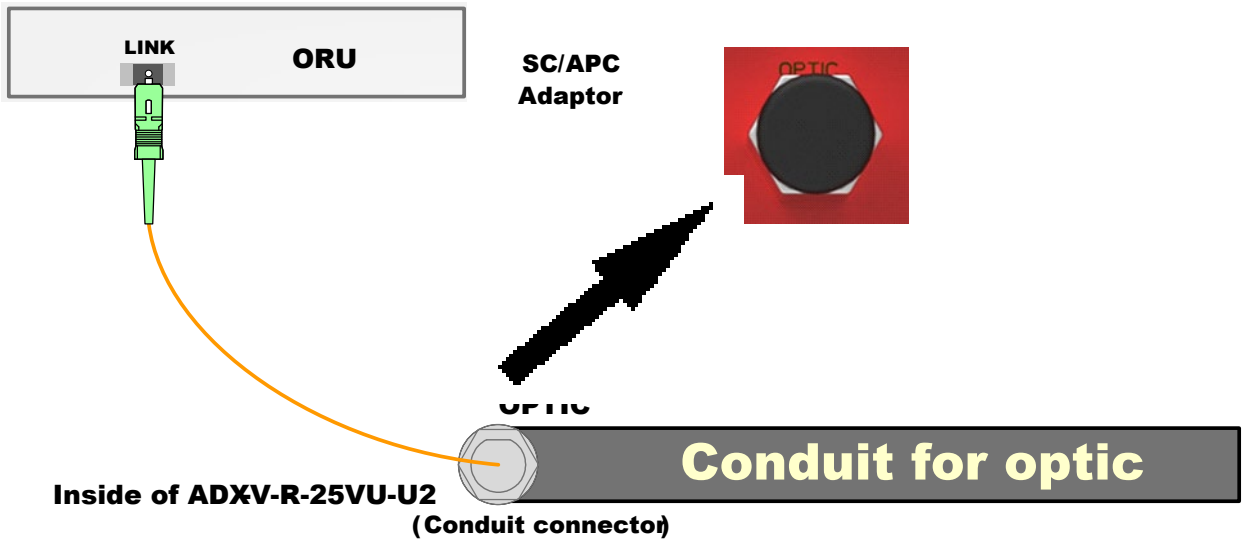


Figure 3-7 Optic port

ORU located inside of equipment has 1 optic port (SC/APC type) for the link to the ADXV-HE.
Optical connectors and ports must be kept clean and should be cleaned before any connections are made. In addition, please ensure that the optical cable is free of any sharp bends to prevent optical power from reflecting back to the unit and minimize the about of optic loss between the ADXV-HE and the ADXV-R-25VU-U2.

.

- We recommend cleaning the optic connectors using a dry optical cleaning swab or tissue in a dry environment as needed. We recommend cleaning the optic connectors only if the expected optic loss is higher than the loss reported in the Web-GUI by 1.5dBo. (Figure 3-8)
- When optic connectors are not in use, the port should be covered with a protective dust cap. (Figure 3-9)

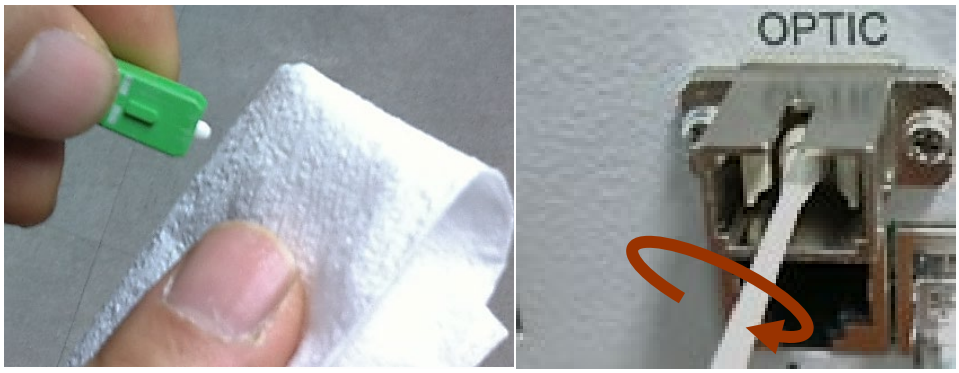


Figure 3-8 Optic Connector Cleaning (left) and Optic Port Cleaning (right)

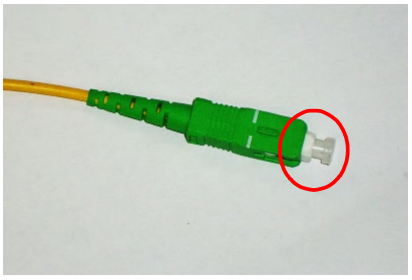


Figure 3-9 SC/APC Optic Connector Dust Cap

2.6 Battery

This port connects to an ADRF 24V battery backup unit via a dedicated cable provided by the ADRF.

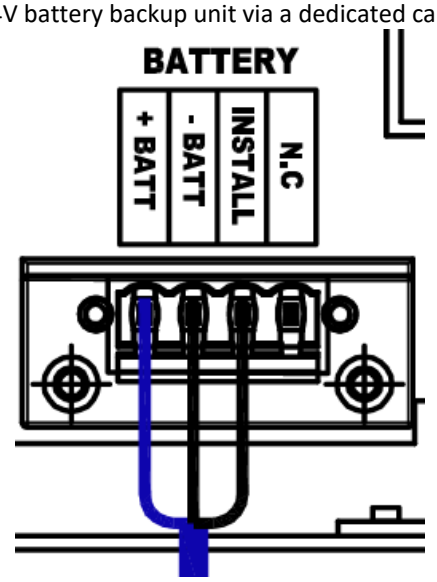


Figure 3-10 Battery Backup Port

If an ADRF 24V battery backup unit is connected to the repeater, the battery switch on the PSU must be switched to the ON position. This will enable the repeater to charge the ADRF 24V battery backup when AC power is present.

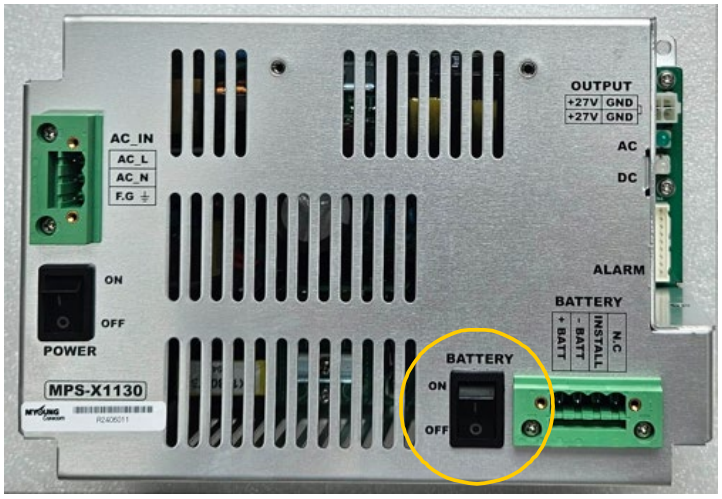


Figure 3-11 Battery Switch

The ADXV-R-25VU-U2 can be connected to an ADRF 24V battery backup unit to provide power during a power failure.

(WARNING: The circuit breaker switch on the ADRF battery backup unit must be set to the OFF position before connecting it to the ADXV-R-25VU-U2 to prevent damage to the repeater, the ADRF battery backup unit, or personal injury.)

Note: Please contact ADRF Technical Support for assistance if you are unfamiliar with the installation procedure of the battery box.

2.7 Grounding

A ground cable is included in the box. The grounding terminals are located on the lower right-hand side of the equipment. The grounding cable should be properly connected before powering on the equipment.

Figure 3-12 Protective Earthing Conductor

Ground terminals located on the side consisted of a 16mm^2(6AWG) and should be permanently connected to the earth (Protective earthing conductor).

3. INSTALLATION

1. To mount on a wall. Using appropriate screws and anchors, attach the BDA to the wall at the four mounting holes

2. Ensure that the isolation between the donor antenna and the service antenna is at least 15 dB greater than the BDA gain.

3. Connect the cable from the donor antenna to the BDA connector labeled “DONOR” and the cable from the service antennas to the BDA connector labeled “SERVER”.

4. Connect the AC power to the BDA and turn on the switch on the left-hand of the PSU.

5. Installation of the equipment is now complete. Adjust the gain controls to suit the specific signal environment through GUI on your PC.

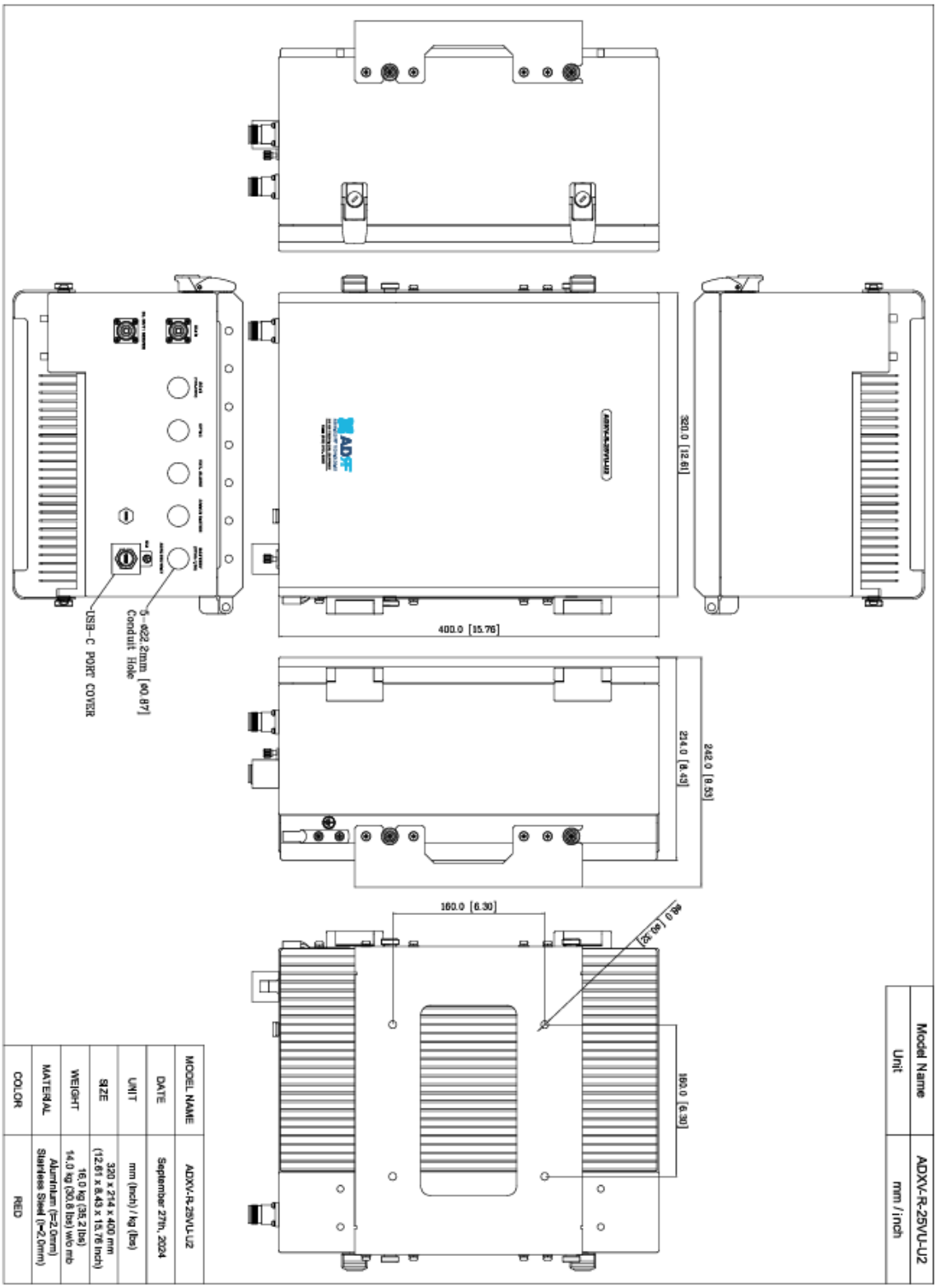
- To prevent feedback, the donor and server antennas must be separated by an appropriate distance to provide sufficient isolation. Isolation is attained by separating antennas at a sufficient distance so that the output of one antenna does not reach the input of the other. This distance is dependent on the gain of the repeater.

- Before 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)

4. SPECIFICATIONS

4.1 ADXV-R-25VU-U2 Specifications

Parameters		VHF/UHF
Frequency	Downlink	VHF 138-174MHz UHF 406.1-521MHz
	Uplink	VHF 138-174MHz UHF 406.1-521MHz
Input Power Range @POIL	Power Mode	+25~ -15dBm
System Gain	Downlink	ADXV-H-POIL-VU to R-25VU-U2: 0~40dB
	Uplink	-20~10dB
Maximum Composite Output Power(DL)		25dBm (Tolerance ±0.5dB)
Maximum Composite Output Power(UL)		-35dBm(Typical)
Noise Figure		≤ 6dB @maximum gain, Center Frequency
VSWR		≤ 1.5:1
Optical Loss		0~5dBo
System Delay		< 2us
Spurious		Meet FCC Rules
Dimension (WXDXH)	H-POIL-VU	2.6 x 17.1 x 6.85 inches
	R-25VU-U2	12.61 x 15.76 x 8.43 inches
Weight	H-POIL-VU	6.61 lbs
	R-25VU-U2	TBD
Operating Temperature	H-POIL-VU	32 ~ 122°F(0 ~ 50°C)
	R-25VU-U2	-22 ~ 131°F(-30 ~ 55°C)
Operating Humidity		5~90%RH
Power Supply	Head-End / RU	110/220V, 50-60Hz with battery backup function
Network Management System		C-Type
RF connector	H-POIL-VU	4.3-10 (Female) | SMBL (Female)
	R-25VU-U2	4.3-10 (Female)

5. MECHANICAL DRAWING

5.1.1 ADXV-R-25VU-U2 Mechanical drawing