Power over Ethernet DC Injector

Switch hub | ETH IN | Protection | ETH OUT | ODU

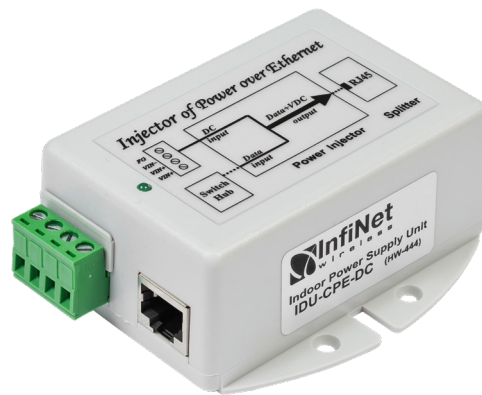PWR | Protection | GND

! WARNING THIS UNIT MUST BE GROUNDED

Powering Infinet Wireless Units

Application Note

Introduction

The scope of the current document is to explain what is necessary to take into account when selecting a suitable power supply for the Infinet Wireless units.

It is necessary to notice that a certain number of unit failures happen upon incorrect DC power supply connections.

Main information:

▶ All Infinet Wireless units powered up via Power-over-Ethernet.

▶ Any power supply source (AC or DC) is supported.

General overview

Infinet Wireless supply the customer with the complete solution for the wireless Point-to-Point and Point -to-MultiPoint connections, including power supply. All Infinet Wireless units powered via PoE technology through Ethernet twisted pair cable. Both AC and DC power sources are supported. Infinet Wireless provides different power injectors to suit any combination of power source and technical conditions on site. All Infinet Wireless power supply devices are at the following picture:
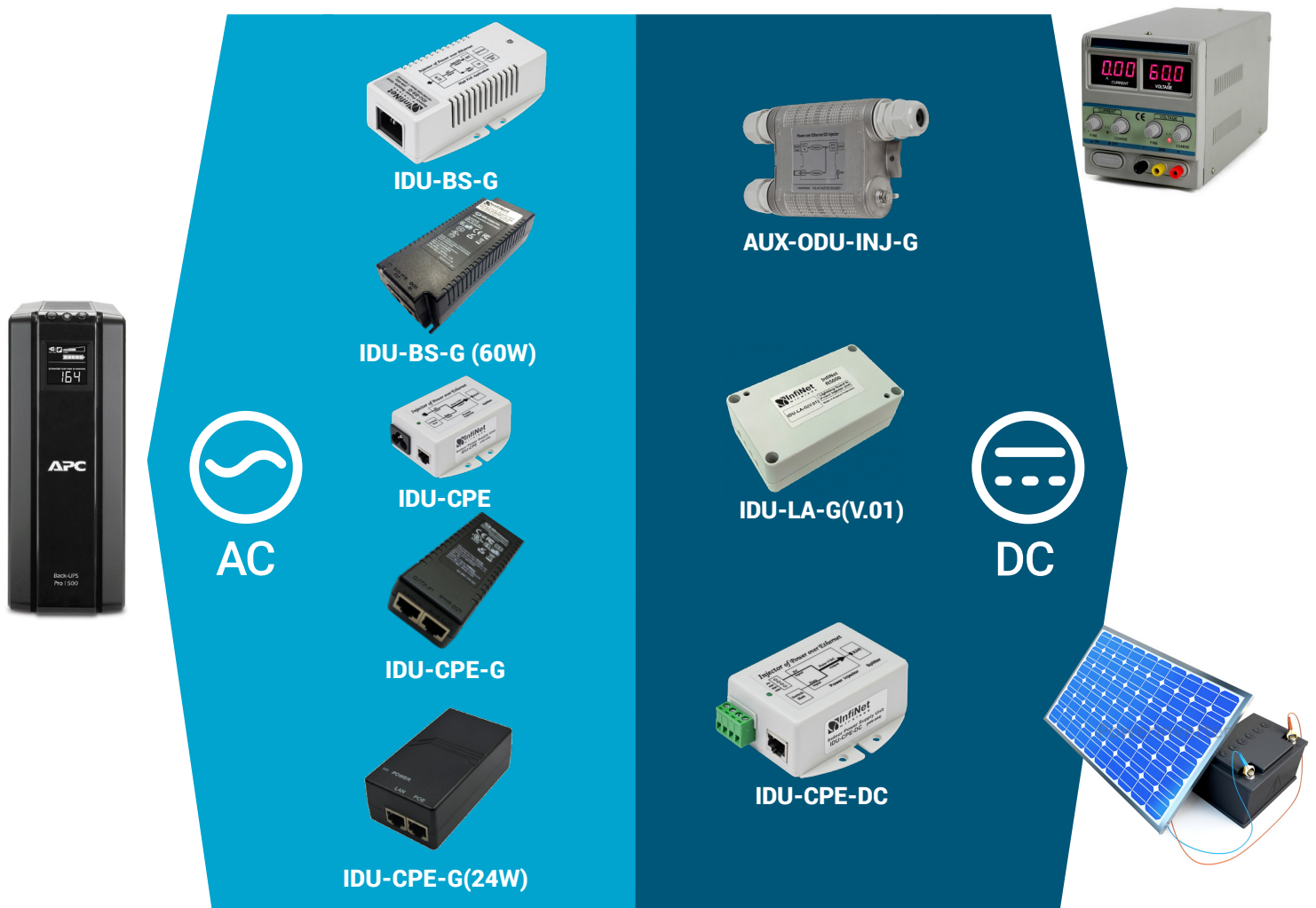

Figure 1 Infinet Wireless power supply

IDU-LA-G (V.01) and **AUX-ODU-INJ-G p**ower injectors can be used with any type of power supply with the appropriate electrical characteristics. Injectors can greatly simplify the installation process in cases where only DC sources exist in the installation site. Different power and Ethernet cables are used to power up the Infinet Wireless units. A detailed table matching power supplies and IW units is given below.

Power supply specifications and its compliance with the Infinet Wireless units

Parameters	IDU-BS-G	IDU-BS-G(60W)	IDU-CPE	IDU-CPE-G(24W)	IDU-CPE-G	AUX-ODU-INJ-G	IDU-LA-G(V.01)	IDU-CPE-DC
Picture								
Power source supported	AC	AC	AC	AC	AC	DC	DC	DC
Modification	indoor	indoor	indoor	indoor	indoor	outdoor	indoor	indoor
Input voltage supported, V	100-240	100-240	100-240	100-240	100-240	+9 .. +56 / ±43 .. ±56	+9 .. +56 / ±43 .. ±56	± 36 to 72
Output voltage, VDC	+56	+55	+48	+48	+48	same as input	same as input	+48
Pin assignment and polarity	4/5 (+), 7/8 (-)	4/5 (+), 7/8 (-)	4/5 (+), 7/8 (-)	4/5(+), 7/8(-)	4/5 (+), 7/8 (-)	4/5 (+), 7/8 (-)	1/2 (+), 3/6 (-), 4/5 (+), 7/8 (-)	4/5 (+), 7/8 (-)
Consumption, W	50.4	60	24	28	15,4	-	-	24
Infinet Wireless models								
Um/Xm		✓					✓	✓
E5-BS/E6-BS		✓					✓	✓
E5-ST/E6-ST		✓		✓			✓	✓
R5000-Mmx/R5000-Omx	✓	✓					✓	✓
R5000-Qmxb		✓					✓	✓
R5000-Smn/R5000-Lmn	✓	✓	✓	✓	✓	✓	✓	✓
Q5/Q6		✓		✓	✓		✓	✓
Q70		✓		✓	✓		✓	✓
AUX-ODU-SYNC	✓	✓	✓	✓	✓		✓	✓
Feature	Supplied by default for R5000-Mmx, R5000-Omx	Supplied by default for Um, Xm, R5000-Qmxb, E5-BS, E6-BS	Supplied by default for Smn, Lmn, AUX-ODU-SYNC	Supplied by default for Q5, Q70, E5-ST, E6-ST		Outdoor installation GR-1089		

Power supply features of Infinet Wireless units

Model	Um/Xm InfiLINK XG 1000	Um/Xm InfiLINK XG	E5-BS/ E6-BS	E5-ST/ E6-ST	R5000-Mmx/ R5000-Omx	R5000-Qmxb	R5000-Smn/ R5000-Lmn	Q5 / Q6	Q70	AUX-ODU-SYNC
Consumption, W	55	30	30	15	20	35	15 (20 for Smnb/ Lmnb)	15	15	/ 4
Input voltage, VDC	±43...±56	±43...±56	±43...±56	±43...±56	±43...±56	±43...±56	+9...+56	±43...±56	±43...±56	±19...±56
PoE type	Proprietary PoE (4 pairs)	Proprietary PoE (4 pairs)	Proprietary PoE or 802.3at (4 pairs)	Proprietary PoE or 802.3at (2 pairs)	Proprietary PoE (2 pairs)	Proprietary PoE (4 pairs)	Proprietary PoE (2 pairs)	Proprietary PoE or 802.3at (2 pairs)	Proprietary PoE or 802.3at (2 pairs)	Proprietary PoE (4 pairs)

Important Infinet Wireless technical specification parameters are shown at the table above.

Main difference for the units power supply in incredibly small minimum value for R5000-Smn, R5000-Lmn, E5-ST, E6-ST, Q5, Q6 and Q70 models. This has been done on purpose to have possibility to install units everywhere the customer needs communication. Low consumption (around 15 W) coupled with 12 V (for example) results in necessity to install only battery with solar panel for wireless channel equipment operation. Solar panel will charge the battery and unit during the daytime, while battery backup operation during night time.

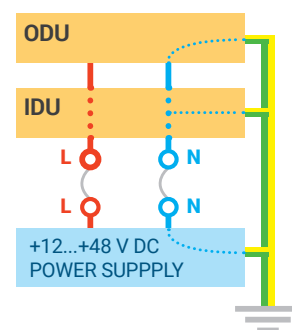# Consequences of polarity non-observance when connecting power supplies with R5000-Smn, R5000-Lmn units

In terms of power supply potential issue is concerned for R5000-Smn/R5000-Lmn unit only. Their weakness is directly connected with their strong part. Since R5000-Smn, R5000-Lmn could be powered up from even 9V battery and placed in different locations but they do not have built-in protection from incorrect DC voltage application. Positive DC will power up the units, while negative DC will burn them completely very shortly.

Powering R5000-Smn / R5000-Lmn models means a positive voltage supply directly to the devices, with the common zero (or negative) pole of the power source connected to a grounded mast / metal structure.

PROPER DC POWER SOURCE APPLICATION

IDU-LA-G (V.01) and AUX-ODU-INJ-G converters can be used to supply power from DC sources and transfer the voltage to the external unit via an E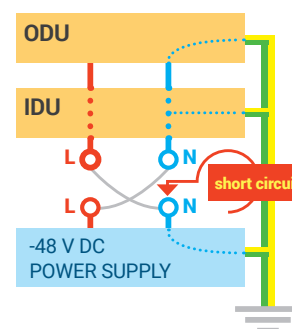thernet cable (PoE) without any changes. Converters must be connected in accordance with the scheme and grounded in accordance with the requirements of the electrical installations rules. Correct connection and grounding provides safe and trouble-free operation of units.

INCORRECT -48VDC POWER CONNECTION SCHEME

As common telecom equipment utilizes -48VDC power supply, this voltage is readily available on most installation sites. However, some users believe that connecting neutral terminal of the -48VDC power supply to the line terminal of the power injector, and line terminal of the power supply to the neutral terminal of the power injector would reverse the -48VDC voltage to +48VDC.

While this hypothesis is true in terms of electrical potential difference, such connection scheme also creates a short circuit due to the fact that the neutral lines in DC-powered equipment are grounded. Once the system is powered on, this short circuit causes rapid current growth, permanently damaging power injector, unit and possibly the power supply itself.
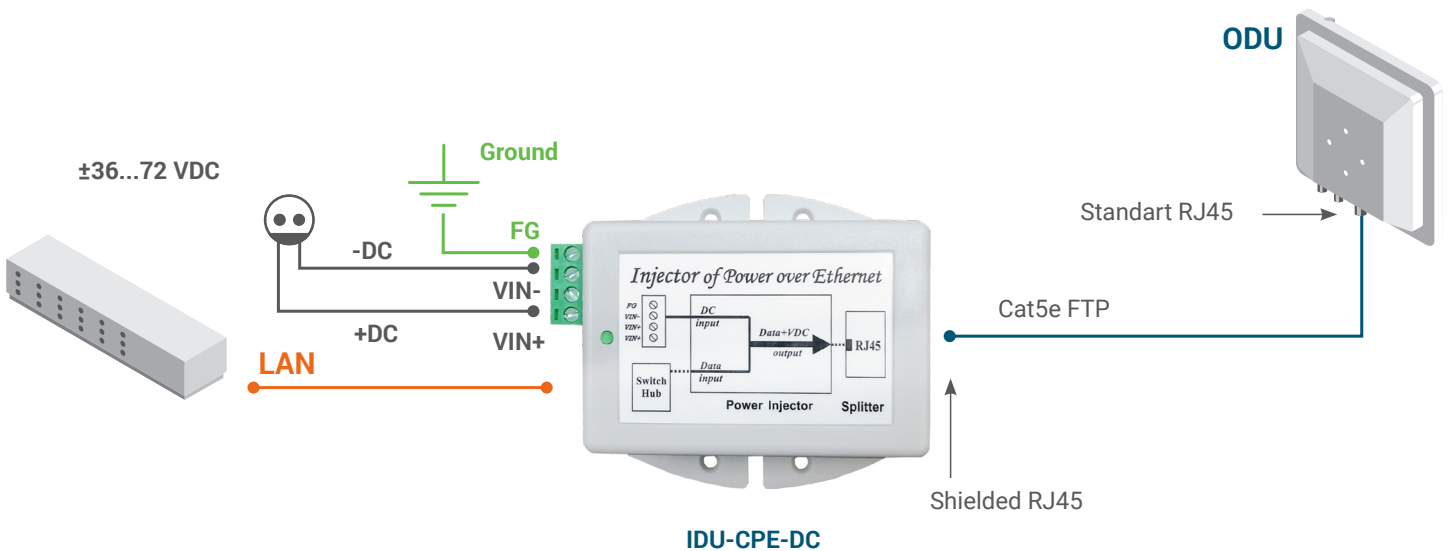
Note that using incorrect power supply voltage voids unit warranty!
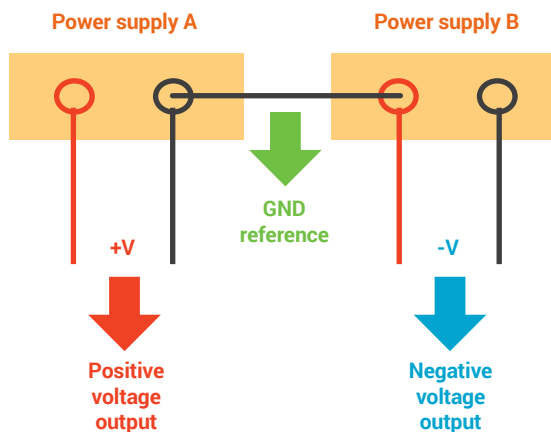
CONNECTING -48VDC POWER SUPPLY

In case the installation place has only negative DC it is recommended to avoid usage of IDU-LA-G (V.01) and AUX-ODU-INJ-G converters with the R5000-Smn/R5000-Lmn models. In case absence of positive DC only IDU-CPE-DC should be used with R5000-Smn, R5000-Lmn models.

The converter has built-in protection against an incorrect connection of -48VDC, and it is powered by a constant current source in the voltage range ± 36 ... 72VDC.

POSITIVE AND NEGATIVE VOLTAGE

To obtain a positive and negative voltage, use the DC power supply connection diagram shown below:

INFINET UNITS AND STANDARD-BASED POWER SOURSING EQUIPMENT

All Infinet units support proprietary PoE. Compatebility to any 3rd part power sourcing equipment both standard-based and proprietary is not guaranteed.

WARNING: any damage caused by the incompatible power sourcing equipment will not be covered by warranty.

Conclusions

Infinet Wireless units are capable to suit any customer's requirements in terms of power supply. If the Infinet Wireless units have to be powered from an AC or DC supply, the following devices should be used:

Indoor AC power supply:

- ▶ IDU-BS-G is supplied by default for R5000-Mmx, R5000-Omx models.
- ▶ IDU-BS-G(60W) is supplied by default for Xm, Um, R5000-Qmxb, E5-BS, E6-BS models.
- ▶ IDU-CPE is supplied by default for R5000-Smn, R5000-Lmn models and AUX-ODU-SYNC.
- ▶ IDU-CPE-G(24W) is supplied by default for Q5, Q6, Q70, E5-ST, E6-ST models.

Indoor DC power supply:

- ▶ IDU-LA-G(V.01) for InfiLINK XG, InfiLINK XG 1000, InfiLINK 2x2, InfiMAN 2x2, Quanta 5, Quanta 6, Quanta 70, InfiLINK Evolution and InfiMAN Evolution families (positive for R5000-Smn, R5000-Lmn).
- ▶ IDU-CPE-DC for R5000-Smn, R5000-Lmn models.

Outdoor DC power supply:

- ▶ AUX-ODU-INJ-G for InfiLINK XG, InfiLINK XG 1000, InfiLINK 2x2, InfiMAN 2x2, Quanta 5, Quanta 6, Quanta 70, InfiLINK Evolution and InfiMAN Evolution families (positive for R5000-Smn, R5000-Lmn).

Links to the specifications:

IDU-BS-G	infinetwireless.com/products/accessories/IDU-BS-G
IDU-BS-G(60W)	infinetwireless.com/products/accessories/idu-bs-g60w
IDU-CPE	infinetwireless.com/products/accessories/IDU-CPE
IDU-LA-G(V.01)	infinetwireless.com/products/accessories/IDU-LA-G (V.01)
IDU-CPE-DC	infinetwireless.com/products/accessories/indoor-dcdc-injector-for-cpe-units-with-integrated-lighting-protection-idu-cpe-dc
AUX-ODU-INJ-G	infinetwireless.com/products/accessories/lightning-protection-unit-with-injector-aux-odu-inj-g