

PK1276 Water Meter End Node User Guide



www.apana.com

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1 Introduction

1.1 Purpose

The purpose of this document is to assist end users in integrating the APANA PK1276 into their network.

1.2 Orderable Part Numbers

Description	Part No.	Market	Frequency
Water Meter End Device	PK1276	N. America	902 to 928MHz
	PK1276-USB	N. America	902 to 928MHz

1.3 Block Diagram

For electrical block diagram, see latest revision of **HCI-002-BD APANA PK1276 Block Diagram**.

1.4 Mechanical

See **HCI-002-MECH APANA PK1276 Mechanical Drawing** for mechanical information.

1.5 Installation

The APANA PK1276 is a professionally installed system ONLY.



WARNING: Changes or modifications not expressly approved by the manufacturer could void the user’s authority to operate the equipment.

2 Minimum Electrical Connections

2.1 Battery Operation, Internal Antenna

2.1.1 Water Meter

For both the PK1276-AMR & PK1276-PUL that operate from battery and use the internal antenna, the minimum connection is an external water meter (see datasheet for supported interfaces).

2.2 External Power

2.2.1 Power Only

When operating from external power, plug the USB cable into the supplied AC/DC converter.

2.3 External Antenna

Independently of other operating modes (for different sensors and internal/external power), an external antenna can be connected. External antenna configuration requires software configuration using USB or OTA from companion device.

3 Other Considerations

3.1 Approved Power Supply

Use only the provided power cable and power supply (AC-to-USB converter). The following is informational only.

3.1.1 Power Overview

A standard USB 2.0 power supply (see datasheet for voltage range) at 500 mA is required for external power operation. In the event that the voltage is too low, the unit will automatically switch to battery operation. In this way, the internal battery serves as an uninterruptible power supply (UPS), in the event that external power is used, but is interrupted.

3.2 LEDs

The PK1276 does not have any LEDs or a display.

3.3 Firmware Updates

Firmware updates are not possible in the field. Units must be returned to manufacturer for reprogram.

4 Safety and Security

4.1 For your safety

To prevent damage to your device or injury to you or to others, please read the following safety precautions in their entirety before using the device and visit our website at www.apana.com to obtain further safety and security information.

4.2 Do not disassemble

This device is not intended to be disassembled. Do not attempt to open the enclosure. Any such attempt will void the warranty and may result in personal injury.

4.3 Use only provided and/or recommended cables & accessories

Only use cables, antennas, and power sources provided with the device, or recommended herein.

4.4 Battery safety

4.4.1 Overview

This device contains a lithium-thionyl chloride (Li-SOCL₂) battery that must be handled and disposed of properly. The device enclosure should never be opened, for any reason, including battery replacement. In the event of an equipment malfunction, including dead battery, contact APANA www.apana.com.

4.4.2 Technology

Li-SOCL₂ batteries are a high-energy density sealed battery containing dangerous (Lithium) and deleterious (Thionyl Chloride) materials. For this reason, improper handling of the battery could lead to distortion, leakage, overheating, explosion, fire, or generation of irritating/corrosive gases, causing bodily injury or equipment trouble. Please observe the following instructions to prevent accidents.

4.4.3 Battery safety tips

Follow the battery safety items below:

- **Never swallow.** Always keep the battery out of the reach of infants and young children to prevent it from being swallowed. If swallowed, consult a physician immediately.
- **Never apply an excessive force to the positive terminal.** Because the positive terminal is sealed by a glass, subjecting this area to sudden jolts and excessive force (over 19.6 N) could destroy the glass seal. This could cause leakage and the generation of irritating/corrosive gases.
- **Never drop.** Dropping the battery could destroy the glass seal leading to leakage and the generation of irritating/corrosive gases.
- **Never weld the terminals or weld a wire to the body of the battery directly.** The heat of welding or soldering could cause the lithium to melt, or cause damage to the insulating material in the battery, leading to possible distortion, leakage, overheating, explosion, or fire, or generation of irritating/corrosive gases. When soldering the battery directly to equipment, solder only the tabs or leads. Even then, the temperature of the soldering iron must be below 350 deg. C and the soldering time less than 5 seconds. Do not use a soldering bath, because the circuit board with battery attached could stop moving or the battery could drop into the bath. Moreover, do not use excessive solder, because the solder could flow to unwanted portions of the board, leading to a short-circuit or charging of the battery.
- **Never short-circuit the battery.** Do not allow the positive and negative terminals to short-circuit. Never carry or store the battery with metal objects such as a necklace or a hairpin. Do not take multiple batteries out of the package and pile or mix them when storing. Otherwise, this could lead to distortion, leakage, overheating, and explosion of the battery.
- **Never charge.** The battery is not designed to be charged by any other electrical source. Charging could generate gas and internal short-circuiting, leading to distortion, leakage, overheating, explosion, fire, or generation of irritating/corrosive gases.
- **Never forcibly discharge.** Forcibly discharging by an external power source or other batteries could cause the voltage to fall below 0V (reversing the poles), generating gas inside the battery and leading to distortion, leakage, overheating, explosion, fire, or generation of irritating/corrosive gases.
- **Never heat.** Heating the battery to more than 100 deg. C could increase the internal pressure, causing distortion, leakage, overheating, explosion, fire, or generation of irritating/corrosive gases.
- **Never expose to open flames.** Exposing to flames could cause the lithium metal to melt, causing the battery to catch on fire and explode.
- **Never disassemble the battery.** Disassembly could generate the irritating/corrosive gases. In addition, the lithium metal inside the battery could overheat, leading to catch on fire.
- **Never deform.** Deforming could cause leakage, overheating, explosion, fire, or generation of irritating/corrosive gases.
- **Never reverse the positive and negative terminals when mounting.** Improper mounting of the battery could lead to short-circuiting, charging or forced-discharging. This could cause distortion, leakage, overheating, explosion, fire, or generation of irritating/corrosive gases.
- **Never use different batteries together.** Using different batteries together, i.e. different type or used and new or different manufacturer could cause distortion, leakage, overheating, explosion, fire, or generation of irritating/corrosive gases because of the differences in battery property.
- **Never allow liquid leaking from the battery to get in your eyes or mouth.** Because this liquid could cause serious damage, if it does come in contact with your eyes, flush them immediately

with plenty of water and consult a physician. Likewise, if the liquid gets in your mouth, rinse immediately with plenty of water and consult a physician.

- **Never touch the battery electrodes.** Do not allow the battery electrodes to come in contact with your skin or fingers. Otherwise, the moisture from your skin could cause a discharge of the battery, which could produce certain chemical substances causing you to receive a chemical burn.

4.4.4 Battery Disposal

The battery may be regulated by national or local regulation. Please follow the instructions of proper regulation. As electric capacity is left in a discarded battery and it comes into contact with other metals, it could lead to distortion, leakage, overheating, or explosion, so make sure to cover the (+) and (-) terminals with friction tape or some other insulator before disposal.

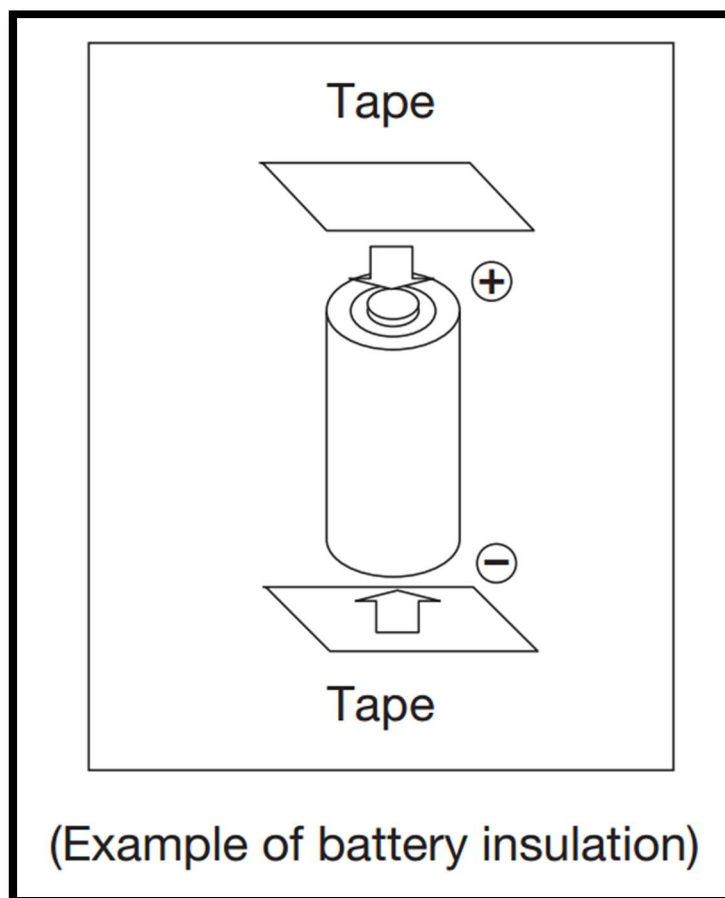


Figure 1. Example of insulating battery for disposal

4.4.5 Storage

Avoiding storing the battery in direct sunlight, or in excessively hot and humid locations, and store it out of the way of rainwater and other adverse environmental elements.

4.4.6 Battery Replacement

Never replace the batteries yourself. When replacement is necessary, please contact the manufacturer.

5 Certification and Compliance

5.1 FCC ID

The PK1276 FCC ID is 2AK5C-APANA-PK1276.

5.2 IC ID

The PK1276 IC ID is 22417-APANAPK1276.

5.3 Information to user

Changes or modifications not expressly approved by the manufacturer could void the user's authority to operate the equipment.

5.4 Radiation Exposure Statements

5.4.1 FCC

To satisfy FCC RF exposure requirements for mobile and base station transmission devices, a separation distance of 20 cm or more should be maintained between the antenna of this device and persons during operation. To ensure compliance, operation at closer than this distance is not recommended. The antenna(s) used for this transmitter must not be co-located or operating in conjunction with any other antenna or transmitter.

5.4.2 Industry Canada (IC)

Important Note for mobile device use Radiation Exposure Statement:

This equipment complies with IC radiation exposure limits set forth for an uncontrolled environment. This equipment should be installed and operated with minimum distance 20cm between the radiator & your body.

Note Importante pour l'utilisation de dispositifs mobiles

Déclaration d'exposition aux radiations:

Cet équipement est conforme aux limites d'exposition aux rayonnements IC établies pour un environnement non contrôlé. Cet équipement doit être installé et utilisé avec un minimum de 20 cm de distance entre la source de rayonnement et votre corps.

5.5 Interference Statements

5.5.1 FCC

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 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 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.

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

This radio transmitter (FCC: 2AK5C-APANA-PK1276) has been approved by FCC 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.

Antenna Information: 902-928 MHz, linearly-polarized antenna, Gain: 3.0 dBi max

5.5.2 Industry Canada (IC)

This device complies with Industry Canada license-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'Industrie 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.

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 permitted for successful communication.

This device has been designed to operate with the antennas listed in the filing, and having a maximum gain of 3.0 dBi. Antennas not included in this list or having a gain greater than 3.0 dBi are strictly prohibited for use with this device. The required antenna impedance is 50 ohms.

5.6 RF Cable

5.6.1 Minimum Cable Loss

There is no minimum cable loss requirement.

5.6.2 Maximum Cable Loss

There is no regulatory maximum cable loss for the antenna cables. However, for best performance, a maximum of 5dB cable loss is recommended.

5.7 Antenna

5.7.1 Antenna Gain

Antenna tested with the PK1276 were simple monopole with up to 3.0dBi gain.

5.7.2 List of Approved Antenna

Manfr	Manfr P/N	FREQ (MHz)	Mounting	Max VSWR	Efficiency	Polarization	Max Gain	Indoor/Outdoor
2J-Antenna	2J2024B-915	902-928	Wall	1.6	55%	Linear	3.0dBi	Indoor
Taoglas	TI.19.2113	902-915	Connector	1.9	82%	Linear	2.5dBi	Indoor
Antenova	A10472	902-928	PCB	1.2	65%	Linear	0.7dBi	Indoor/Outdoor

6 Additional Information

6.1 References

Doc#	Title
HCI-002-DS	APANA PK1276 Datasheet
HCI-002-UG	APANA PK1276 User Guide
HCI-002-MECH	APANA PK1276 Mechanical Drawing
HCI-002-BD	APANA PK1276 Block Diagram
HCI-002-OD	APANA PK1276 Operational Description

6.2 References and Resources

The following document references are useful to assist in integration:

- Semtech
 - [Semtech LoRa Website](#)
 - [Semtech SX1276 Datasheet](#)

6.3 Disclaimer

Every attempt was made to ensure the accuracy of the information contained in this document. However, no responsibility is assumed for any incorrect information.

7 Contact

Primary Office & Mailing Address

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 USA

8 Document History

8.1 Revisions

Rev	Date	Description
001	14 Feb 2017	Initial draft
002	15 Feb 2017	Updated IC number (removed hyphen) Added French statements for IC Added additional battery safety information Added “professional install only”
003	16 Feb 2017	Added French translation to 6.5.2 IC Removed reference to 12dBi antennas (changed to 3.5dBi, our max certified antenna)
004	17 Feb 2017	Removed “RSS-247” from 6.5.2 Changed typo on pg 11
005	13 June 2017	Removed two antennas with gain >3.0dBi from antenna list
006	13 June 2017	Corrected typos, removed mention of 3.5dBi antenna elsewhere in the antenna (to reflect our max antenna gain of 3.0dBi)
007	27 March 2018	Removed International Variants, power Tx references, footer edits and general reformat