

Product Guide:
On-Metal RFID Labels

RFID label

https://www.rfidlabel.com

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Product Overview

On-metal RFID label is specifically designed to be attached to a metal surface. Such labels are often highly durable and anti-interference and can track metal assets, equipment, tools, etc. Labels are suitable for many industrial applications such as warehousing management, logistics tracking, asset management, the automotive industry and other areas where real-time tracking of metal items is required.

NFC On-Metal Label

SKU	Dimensions (mm)	Chip Type	User Memory	Read Distance (Max.)
AZL-213-OM-D30	Ø30	NXP® NTAG® 213	144 bytes	10 cm
AZL-213-PET3M-OM-3030	30×30	NXP® NTAG® 213	144 bytes	10 cm

UHF On-Metal Label

SKU	Dimensions (mm)	Chip Type	EPC Memory	Read Distance (Max.)
Regular UHF On-Metal Label				
AZL-R6P-OMPET3M-3015	30×15×1.25	Impinj® Monza® R6-P	128/96 bits	0.9 m
AZ-R6P-OMPET-5515	55×15×1.25	Impinj® Monza® R6-P	128/96 bits	5.5 m
AZL-R6P-OMPET-6025	60×25×1	Impinj® Monza® R6-P	128/96 bits	8 m
AZ-R6P-OMPET-7030	70×30×1	Impinj® Monza® R6-P	128/96 bits	8 m
AZ-R6P-OMPET-7050	70×50×1	Impinj® Monza® R6-P	128/96 bits	8 m
AZ-R6P-OMPET-8040	80×40×1	Impinj® Monza® R6-P	128/96 bits	7 m
AZ-R6P-OMPET-9522	95×22×1.25	Impinj® Monza® R6-P	128/96 bits	12 m
AZL-U8-OMPET-2010	20×10×1	NXP® UCODE® 8	128 bits	1.5 m
AZ-U8-OMPET3M-3015	30×15×1.25	NXP® UCODE® 8	128 bits	2.7 m
AZ-U8-OMPET-5015	50×15×1	NXP® UCODE® 8	128 bits	2.4 m

AZL-U8-LROMPET-6025	60×25×1	NXP® UCODE® 8	128 bits	9.5 m
AZL-U8-OMPET-6025	60×25×1	NXP® UCODE® 8	128 bits	5.7 m
AZL-U8-OMPET-6535	65×35×1.25	NXP® UCODE® 8	128 bits	15 m
AZL-U8-OMPET-7030	70×30×1	NXP® UCODE® 8	128 bits	12 m
AZL-UDNA-OMPET-7030	70×30	NXP® UCODE® DNA	224 bits	11.5 m
AZL-U9XE-OMPET-6025	60×25×1	NXP® UCODE® 9xe	128 bits	2.8 m
AZL-M730-OMPET-6535	65×35×1	Impinj® M730	128 bits	4 m
Ultra Thin UHF On-Metal Label				
AZL-M830-OMPET-7030	70×30×0.4	Impinj® M830	128 bits	4.5 m
Tamper Evident UHF On-Metal Label				
AZL-U9XE-OMPET3M-6025	60×25×1.25	NXP® UCODE® 9xe	128 bits	2.8 m
AZL-H9-OMPET3M-7525	75×25×1.25	Alien® Higgs® 9	96-496 bits	7.5 m
AZL-R6P-OMPET-TE-9040	90×40×2.2	Impinj® Monza® R6-P	128/96 bits	4 m
On-Liquid & On-Metal UHF Label				
AZ-U8-OMPET-6406	64×6×1	NXP® UCODE® 8	128 bits	6.5 m
AZL-U8-CPFL-7045	70×45	NXP® UCODE® 8	128 bits	2.6 m
AZL-U9-CPOL-5530	55×30	NXP® UCODE® 9	96 bits	4 m
AZL-U9XM-OMPET-10040	100×40×1	NXP® UCODE® 9xm	Up to 496 bits	12.5 m

NFC On-Metal Label



SKU: AZL-213-OM-D30
Label Size: Ø30 mm
Chip Type: NXP® NTAG® 213
Frequency Band: HF 13.56 MHz
International Standard: ISO/IEC 14443-A, NFC Forum Type 2
User Memory: 144 bytes
UID Memory: 7 bytes
Read Distance: Up to 10 cm

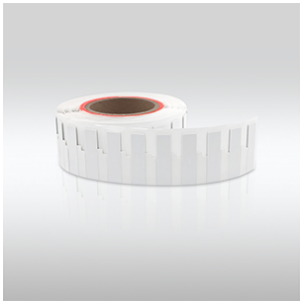


SKU: AZL-213-PET3M-OM-3030
Label Size: 30×30 mm
Chip Type: NXP® NTAG® 213
Frequency Band: HF 13.56 MHz
International Standard: ISO/IEC 14443-A, NFC Forum Type 2
User Memory: 144 bytes
UID Memory: 7 bytes
Read Distance: Up to 10 cm

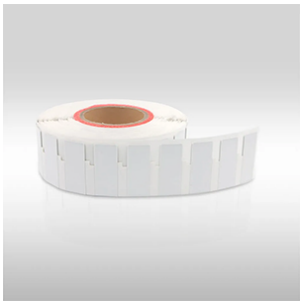
UHF On-Metal Label



SKU: AZL-R6P-OMPET3M-3015
Label Size: 30×15×1.25 mm
Chip Type: Impinj® Monza® R6-P
Frequency Band: UHF 860-960 MHz
International Standard: ISO/IEC 18000-6C, EPC Global Gen2v2
EPC Memory: 128/96 bits
User Memory: 32/64 bits
IP Rating: IP68, test for 5 hours at 1m deep water
Read Distance:
2W ERP FCC: 0.9 m on metal, 0.9 m off metal
2W ERP ETSI: 0.8 m on metal, 0.8 m off metal



SKU: AZ-R6P-OMPET-5515
Label Size: 55×15×1.25 mm
Chip Type: Impinj® Monza® R6-P
Frequency Band: UHF 860-960 MHz
International Standard: ISO/IEC 18000-6C, EPC Global Gen2v2
EPC Memory: 128/96 bits
User Memory: 32/64 bits
IP Rating: IP68, test for 5 hours at 1 m deep water
Read Distance:
2W ERP FCC: 5.5 m on-metal, 2.8 m off-metal
2W ERP ETSI: 3.5 m on-metal, 2 m off-metal



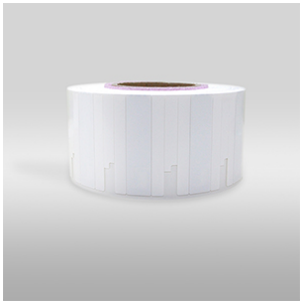
SKU: AZL-R6P-OMPET-6025
Label Size: 60×25×1 mm
Chip Type: Impinj® Monza® R6-P
Frequency Band: UHF 865-868 MHz(EU)
International Standard: ISO/IEC 18000-6C, EPC Global Gen2v2
EPC Memory: 128/96 bits
User Memory: 32/64 bits
IP Rating: IP68, test for 5 hours at 1 m deep water
Read Distance:
2W ERP FCC: 8 m on-metal
2W ERP ETSI: 5 m on-metal



SKU: AZ-R6P-OMPET-7030
Label Size: 70×30×1 mm
Chip Type: Impinj® Monza® R6-P
Frequency Band: UHF 860-960 MHz
International Standard: ISO/IEC 18000-6C, EPC Global Gen2v2
EPC Memory: 128/96 bits
User Memory: 32/64 bits
IP Rating: IP68, test for 5 hours at 1m deep water
Read Distance:
2W ERP FCC: 8 m on-metal, 4 m off-metal
2W ERP ETSI: 6 m on-metal, 3 m off-metal



SKU: AZ-R6P-OMPET-7050
Label Size: 70×50×1 mm
Chip Type: Impinj® Monza® R6-P
Frequency Band: UHF 860-960 MHz
International Standard: ISO/IEC 18000-6C, EPC Global Gen2v2
EPC Memory: 128/96 bits
User Memory: 32/64 bits
IP Rating: IP68, test for 5 hours at 1 m deep water
Read Distance:
2W ERP FCC: 8 m on-metal



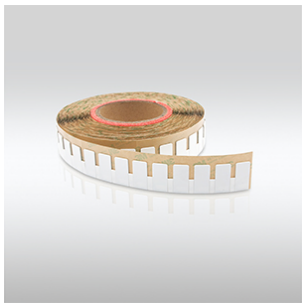
SKU: AZ-R6P-OMPET-8040
Label Size: 80×40×1 mm
Chip Type: Impinj® Monza® R6-P
Frequency Band: UHF 865-868 MHz
International Standard: ISO/IEC 18000-6C, EPC Global Gen2v2
EPC Memory: 128/96 bits
User Memory: 32/64 bits
IP Rating: IP68, test for 5 hours at 1 m deep water
Read Distance:
2W ERP FCC: 7 m on-metal, 4 m off-metal
2W ERP ETSI: 7 m on-metal, 3 m off-metal



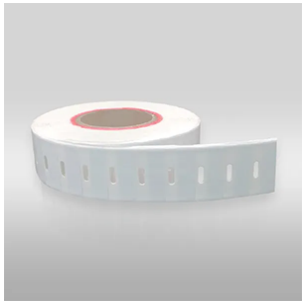
SKU: AZ-R6P-OMPET-9522
Label Size: 95×22×1.25 mm
Chip Type: Impinj® Monza® R6-P
Frequency Band: UHF 865-868 MHz(EU)
International Standard: ISO/IEC 18000-6C, EPC Global Gen2v2
EPC Memory: 128/96 bits
User Memory: 32/64 bits
IP Rating: IP68, test for 5 hours at 1 m deep water
Read Distance:
2W ERP FCC: 10 m on-metal, 12 m off-metal
2W ERP ETSI: 8 m on-metal, 7 m off-metal



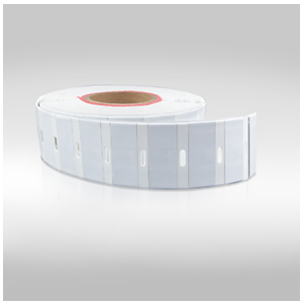
SKU: AZL-U8-OMPET-2010
Label Size: 20×10×1 mm
Chip Type: NXP® UCODE® 8
Frequency Band: UHF 902-928 MHz(US)
International Standard: ISO/IEC 18000-6C, EPC Global Gen2v2
EPC Memory: 128 bits
IP Rating: IP68, test for 5 hours at 1 m deep water
Read Distance: Up to 1.5 m



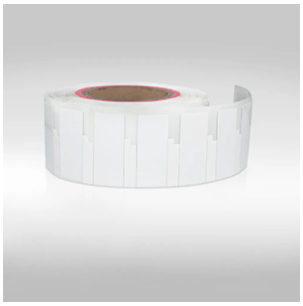
SKU: AZ-U8-OMPET3M-3015
Label Size: 30×15×1.25 mm
Chip Type: NXP® UCODE® 8
Frequency Band: UHF 902-928 MHz(US)
International Standard: ISO/IEC 18000-6C, EPC Global Gen2v2
EPC Memory: 128 bits
IP Rating: IP68, test for 5 hours at 1 m deep water
Read Distance:
Fixed Reader: 2.7 m on-metal(ETSI), 1.7 m off-metal(FCC)
Handheld Reader: 1.5 m on-metal(ETSI), 1 m off-metal(FCC)



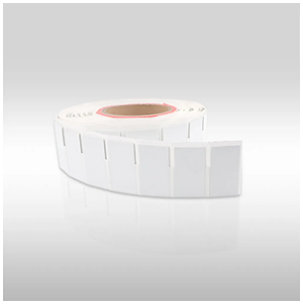
SKU: AZ-U8-OMPET-5015
Label Size: 50×15×1 mm
Chip Type: NXP® UCODE® 8
Frequency Band: UHF 902-928 MHz(US)
International Standard: ISO/IEC 18000-6C, EPC Global Gen2v2
EPC Memory: 128 bits
IP Rating: IP68, test for 5 hours at 1 m deep water
Read Distance: Up to 2.4 m



SKU: AZL-U8-LROMPET-6025
Label Size: 60×25×1 mm
Chip Type: NXP® UCODE® 8
Frequency Band: UHF 902-928 MHz(US)
International Standard: ISO/IEC 18000-6C, EPC Global Gen2v2
EPC Memory: 128 bits
IP Rating: IP68, test for 5 hours at 1 m deep water
Read Distance: Up to 9.5 m



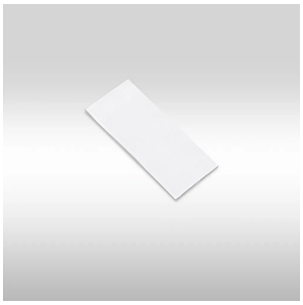
SKU: AZL-U8-OMPET-6025
Label Size: 60×25×1 mm
Chip Type: NXP® UCODE® 8
Frequency Band: UHF 902-928 MHz(US)
International Standard: ISO/IEC 18000-6C, EPC Global Gen2v2
EPC Memory: 128 bits
IP Rating: IP68, test for 5 hours at 1 m deep water
Read Distance: Up to 5.7 m



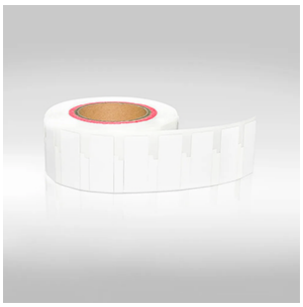
SKU: AZL-U8-OMPET-6535
Label Size: 65×35×1.25 mm
Chip Type: NXP® UCODE® 8
Frequency Band: UHF 865-868 MHz(EU), 902-928(US)
International Standard: ISO/IEC 18000-6C, EPC Global Gen2v2
EPC Memory: 128 bits
IP Rating: IP68, test for 5 hours at 1 m deep water
Read Distance:
Fixed Reader: 13 m on metal(ETSI), 15 m on metal(FCC)
Handheld Reader: 6 m on metal(ETSI), 8 m on metal(FCC)



SKU: AZL-U8-OMPET-7030
Label Size: 70×30×1 mm
Chip Type: NXP® UCODE® 8
Frequency Band: UHF 865-868 MHz(EU)
International Standard: ISO/IEC 18000-6C, EPC Global Gen2v2
EPC Memory: 128 bits
IP Rating: IP68, test for 5 hours at 1 m deep water
Read Distance:
Fixed Reader: 10 m on metal(ETSI), 12 m on metal(FCC)
Handheld Reader: 8 m on metal(ETSI), 6 m on metal(FCC)



SKU: AZL-UDNA-OMPET-7030
Label Size: 70×30 mm
Chip Type: NXP® UCODE® DNA
Frequency Band: UHF 902-928 MHz(US)
International Standard: ISO/IEC 18000-6C, EPC Global Gen2v2
EPC Memory: 224 bits
User Memory: 3072 bits
Label Authentication: 128 bit AES unique crypto key
Read Distance: Up to 11.5 m

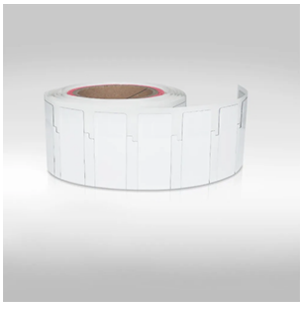


SKU: AZL-U9XE-OMPET-6025
Label Size: 60×25×1 mm
Chip Type: NXP® UCODE® 9xe
Frequency Band: UHF 865-868 MHz(EU)
International Standard: ISO/IEC 18000-6C, EPC Global Gen 2v2.1
EPC Memory: 128 bits
Read Distance: Up to 2.8 m



SKU: AZL-M730-OMPET-6535
Label Size: 65×35×1 mm
Chip Type: Impinj® M730
Frequency Band: UHF 902-928 MHz(US)
International Standard: ISO/IEC 18000-6C, EPC Global Gen2v2
EPC Memory: 128 bits
User Memory: 0 bits
Read Distance: Up to 4 m

Ultra Thin On-Metal Label



SKU: AZL-M830-OMPET-7030
Label Size: 70×30×0.4 mm
Chip Type: Impinj® M830
Frequency Band: UHF 865-868 MHz(EU), 902-928 MHz(US)
International Standard: ISO/IEC 18000-6C, EPC Global Gen2v2
EPC Memory: 128 bits
Read Distance: Up to 4.5 m

Tamper Evident On-Metal Label



SKU: AZL-U9XE-OMPET3M-6025
Label Size: 60×25×1.25 mm
Chip Type: NXP® UCODE® 9xe
Frequency Band: UHF 865-868 MHz(EU)
International Standard: ISO/IEC 18000-6C, EPC Global Gen 2v2.1
EPC Memory: 128 bits
IP Rating: IP68
Read Distance: Up to 2.8 m

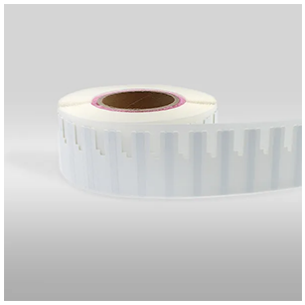


SKU: AZL-H9-OMPET3M-7525
Label Size: 75×25×1.25 mm
Chip Type: Alien® Higgs® 9
Frequency Band: UHF 865-868 MHz(EU)
International Standard: ISO/IEC 18000-6C, EPC Class 1 Gen 2
EPC Memory: 96-496 bits
User Memory: 688 bits
Read Distance: Up to 7.5 m



SKU: AZL-R6P-OMPET-TE-9040
Label Size: 90×40×2.2 mm
Chip Type: Impinj® Monza® R6-P
Frequency Band: UHF 860-960 MHz
International Standard: ISO/IEC 18000-6C, EPC Global Gen2v2
EPC Memory: 128/96 bits
User Memory: 32/64 bits
Read Distance: Up to 4 m

On-Liquid & On-Metal Label



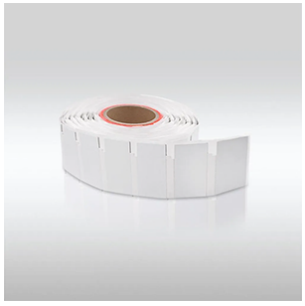
SKU: AZ-U8-OMPET-6406
Label Size: 64×6×1 mm
Chip Type: NXP® UCODE® 8
Frequency Band: UHF 860-960 MHz
International Standard: ISO/IEC 18000-6C, EPC Global Gen2v2
EPC Memory: 128 bits
IP Rating: IP68, test for 5 hours at 1 m deep water
Read Distance:
2W ERP FCC: 4 m on-metal, 4.5 m on-liquid
2W ERP ETSI: 3.5 m on-metal, 6.5 m on-liquid



SKU: AZL-U8-CPFL-7045
Label Size: 70×45 mm
Chip Type: NXP® UCODE® 8
Frequency Band: UHF 860-960 MHz
International Standard: ISO/IEC 18000-6C, EPC Global Gen2v2
EPC Memory: 128 bits
Read Distance: Up to 2.6 m



SKU: AZL-U9-CPOL-5530
Label Size: 55×30 mm
Chip Type: NXP® UCODE® 9
Frequency Band: UHF 860-960 MHz
International Standard: ISO/IEC 18000-6C, EPC Global Gen2v2
EPC Memory: 96 bits
Read Distance: 4 m



SKU: AZL-U9XM-OMPET-10040
Label Size: 100×40×1 mm
Chip Type: NXP® UCODE® 9xm
Frequency Band: UHF 860-960 MHz
International Standard: ISO/IEC 18000-6C, EPC Global Gen2v2
EPC Memory: Up to 496 bits
User Memory: Up to 752 bits
IP Rating: IP68, test for 5 hours at 1 m deep water
Read Distance: Up to 12.5 m

Encoding Instructions

Encoding the NFC Labels

1. Tools

- NFC Device: You need an NFC-enabled smartphone
- Programming Tool: Install the appropriate NFC programming app. such as **“NFC Tools”** or **“TagWriter by NXP”**

2. Preparing Content

Prepare the content that you want to encode inside the NFC label.

For example:
- Product authentication information (brand, serial number, production date, etc.)
- Promotional information or coupon links
- Exclusive social media links or access to brand events
- Unique authentication ID or QR code

3. Encoding Content

NFC Tools

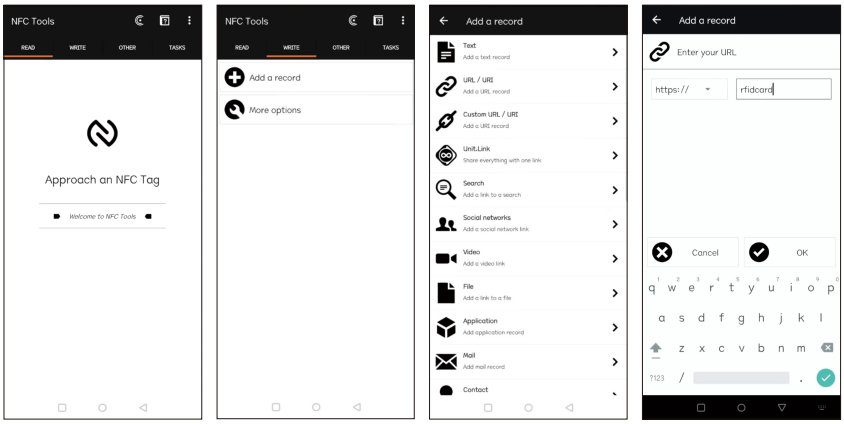
① Run the app

② Go to the “Write” option

③ Click on “Add a record”

④ Choose the data type

⑤ Fill in the information



② ③ ④ ⑤

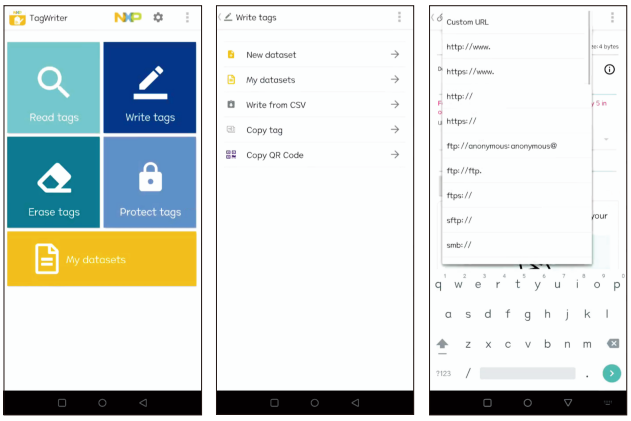
TagWriter by NXP

① Launch the “TagWriter by NXP” app Tap on “Write tags”

② Click on “New dataset”

③ Choose the data type

④ Fill in the information



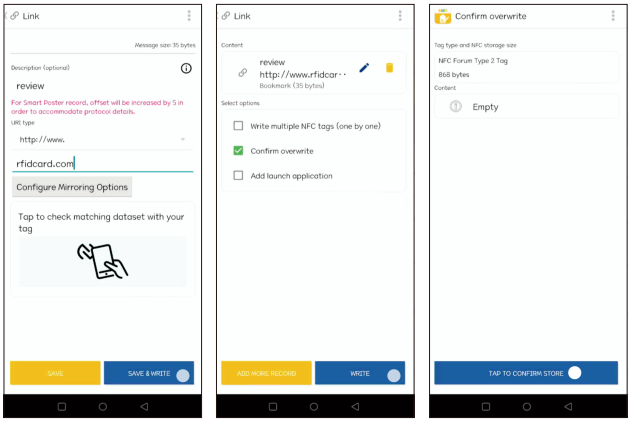
① ② ④

⑤ Tap on the “SAVE & WRITE” option

⑥ Click "WRITE" again on the new page

⑦ Tap on the “SAVE & WRITE” option

⑧ Click "WRITE" again on the new page



⑥ ⑦ ⑧

Encoding the UHF RFID Labels

1. Prepare Encoding Tools

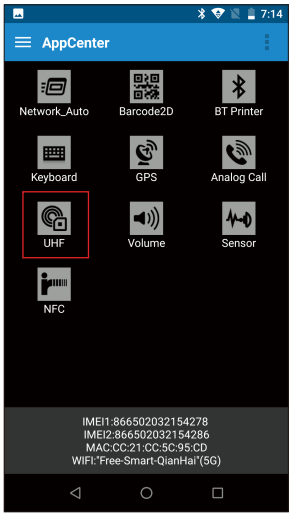
- A UHF RFID Reader
- An app that can encode and read UHF chips

Here we will take our UHF handheld RFID reader, AZH-P1 for demonstration.



2. Encoding the UHF Labels

Select the UHF option in the APP Center on the handheld device.

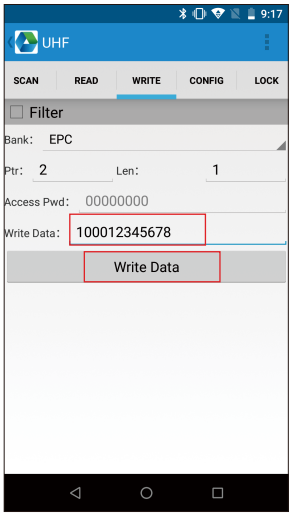


3. Set "EPC" in the "Readwrite tag" Button

① Click the "Readwrite tag" button in the upper left toolbar to enter the encoding page.

② Input the data in the "Length" field, and enter the words (in hexadecimal format) you want to encode in the "character" field
(1 word = 2 bytes = 16 bits = 4 hex characters)

③ Place the label near the reader and click the "Write" button. When the screen displays "success," the encoding is successfully completed.



4. Verification

• After programming is complete, scan the NFC badge with the same NFC device to ensure that the written data can be read properly.

• If you programmed a URL or social media link, the phone should automatically jump to the corresponding page or display the relevant content after scanning the badge.

• If it involves anti-counterfeiting or authentication functions, make sure the verificatio

5. Update and Manage Data Regularly

• The data on the NFC chip can be rewritten, allowing you to update the badge content regularly according to marketing activities or needs. Programming tools usually provide editing and rewriting functions.

• For anti-counterfeiting or encrypted information, ensure that the keys and verification systems are up

Installation

Choose the Installation Location

Select a location where the RFID label is easily scannable, such as the back of a device or the surface of an item. Ensure it's within the effective RFID communication range.

Prepare the Surface

Clean the target surface with a cloth to remove any dust, oil, or debris. A clean surface ensures strong adhesion for the RFID label.

Peel and Apply the Label

Remove the protective film from the back of the RFID label, being careful not to damage it. Press the label firmly onto the chosen surface, ensuring it's free of wrinkles or air bubbles.

Test the Label

Use an RFID reader to scan the label and verify it’s readable. For writable labels, perform a data write test to ensure proper functionality.

FAQ

1. Can On-Metal RFID labels be re-written?

This depends on the type of label. Most On-Metal RFID labels are rewritable, meaning that the data can be written and updated multiple times during its lifetime. However, there are some On-Metal labels that are read-only, where the data is already written at the time of manufacture and cannot be changed.

2. Can On-Metal RFID labels be used with other types of labels?

On-metal RFID labels can be used with other types of labels, especially in mixed environments. For example, some warehouses may use barcode labels, QR code labels and RFID labels to manage different assets at the same time. The key is to choose the right label type and reading device to ensure that the data can be integrated and read smoothly.

3. Does it matter where On-Metal RFID labels are mounted on metal surfaces?

Yes, the mounting position of On-Metal RFID labels has a significant impact on their performance. In general, labels should avoid mounting directly on the edges or corners of metal where signal reflection and interference are most severe. The ideal mounting location is where the metal surface is relatively flat and away from the ground or other metal objects to minimize the impact of reflected signals. At the same time, labels and metal surfaces should be in as close contact as possible to avoid air gaps, which can reduce signal strength.

4. Does the On-Metal RFID label support secondary development?

Some On-Metal RFID labels support secondary development, especially those with high storage capacity. For example, some labels have embedded programmable storage, which allows users to store customized data (e.g. serial numbers, sensor data, etc.) as needed. In addition, some high-end labels also support encryption to ensure the security of stored data. Secondary development usually involves writing operations to the label's storage area, application of encryption algorithms, and communication protocols between the label and the reader.

RFID label

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