adyen

Adyen SFO1 USER GUIDE

LEGAL NOTICE

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SFO1 User Guide

Revision History

Version	Date	Range	Description	Author
1.0.0	18.10.2023	All document	First release	Stefan Mitov
1.1.0	27.10.2023	Setup	Added description for "System Mode"	Stefan Mitov
1.2.0	17.06.2024	All document	Updated content	Rosen Ignatov

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REGULATORY

FCC ID: 2A7UQ-SFO1

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 equipment generates, uses and 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 or more of the following measures:

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 equipment generates, uses and 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 or more 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.

Caution: Any changes or modifications to this device not explicitly approved by manufacturer could void your authority to operate this equipment.   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.
RF Exposure Information: The device has been evaluated to meet general RF exposure requirement. The device can be used in portable exposure conditions without restriction.

ISED Statement

IC: 30044-SFO1

English: 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.
The digital apparatus complies with Canadian CAN ICES-3 (B)/NMB-3(B).

This device meets the exemption from the routine evaluation limits in section 2.5 of RSS 102 and

compliance with RSS 102 RF exposure, users can obtain Canadian information on RF exposure and compliance.

This equipment complies with Canada radiation exposure limits set forth for an uncontrolled environment.

French: Le présentappareilestconforme aux CNR d'Industrie Canada applicables aux appareils radio ex empts de licence. L'exploitationestautorisée aux deux conditions suivantes: (1) l'appareil ne doit pas p roduire de brouillage, et (2) l'utilisateur de l'appareildoit accepter tout brouillageradioélectriquesubi, mêmesi le brouillageest susceptible d'encompromettre le fonctionnement. L'appareil numérique est conforme à CAN CAN ICES-3 (B) / NMB-3 (B).
Cet appareil est conforme à l'exemption des limites d'évaluation courante dans la section 2.5 du cnr - 102 et conformité avec rss 102 de l'exposition aux rf, les utilisateurs peuvent obtenir des données canadiennes sur l'exposition aux champs rf et la conformité.

Cet équipement est conforme aux limites d'exposition aux rayonnements du Canada établies pour un environnement non contrôlé.

English:
Specific Absorption Rate (SAR) information:
This SFO1 meets the government's requirements for exposure to radio waves. The guidelines are based on standards that were developed by independent scientific organizations through periodic and thorough evaluation of scientific studies. The standards include a substantial safety margin designed to assure the safety of all persons regardless of age or health. ISED RF Exposure Information and Statement the SAR limit of Canada(ISED) is 1.6 W/kg averaged over one gram of tissue. Device types: SFO1 has also been tested against this SAR limit. This device was tested for typical body-worn operations with the back of the SFO1 kept 0mm from the body. To maintain compliance with ISED RF exposure requirements, use accessories that maintain an 0mm separation distance between the user's body and the back of the SFO1. The use of belt clips, holsters and similar accessories should not contain metallic components in its assembly. The use of accessories that do not satisfy these requirements may not comply with ISED RF exposure requirements, and should be avoided.

French:
Informations sur le débit d'absorption spécifique (DAS):
Cette SOF1 répond aux exigences du gouvernement en matière d'exposition aux ondes radio. Les lignes directrices sont basées sur des normes élaborées par des organisations scientifiques indépendantes à travers une évaluation périodique et approfondie des études scientifiques. Les normes comprennent une marge de sécurité substantielle conçue pour assurer la sécurité de toutes les personnes, quel que soit leur âge ou leur état de santé. Information et déclaration d'ISDE sur l'exposition aux RF la limite DAS du Canada (ISDE) est de 1,6 W / kg en moyenne sur un gramme de tissu. Types d'appareils: la SOF1 a également été testée par rapport à cette limite SAR. Cet appareil a été testé pour des opérations typiques portées sur le corps avec le dos de la SFO1 gardé à 0 mm du corps. Pour maintenir la conformité avec les exigences d'exposition RF d'ISDE, utilisez des accessoires qui maintiennent une distance de

séparation de 0 mm entre le corps de l'utilisateur et l'arrière de la SFO1. L'utilisation de clips de ceinture, d'étuis et d'accessoires similaires ne doit pas contenir de composants métalliques dans son assemblage. L'utilisation d'accessoires qui ne satisfont pas à ces exigences peut ne pas être conforme aux exigences d'exposition aux RF d'ISDE et doit être évitée.

Waste Electrical & Electronic Equipment

The symbol means that according to local laws and regulations your product shall be disposed of separately from household waste at the end of its working life. To prevent possible harm to the environment or human health from uncontrolled waste disposal, please separate this from other types of wastes and recycle it responsibly to promote the sustainable reuse of material resources.

SFO1 is in conformity with:
Directive 2014/53/EU (RE Directive)

PREFACE

This guide is the primary source of information for setting up and installing Adyen SFO1.

Audience

This guide provides simple descriptions of Adyen SFO1 features, as well as basic information for anyone installing and configuring SFO1.

Organization

This guide is organized as follows:
Chapter 1, Overview. Provides an overview of the Adyen SFO1.

Chapter 2, Specifications. Discusses power requirements and dimensions of Adyen SFO1, etc.

Chapter 3, Setup. Explains setup and installation of Adyen SFO1.
This chapter tells how to establish connections with other devices.

Chapter 4, Maintenance and Cleaning. Explains maintenance of Adyen SFO1.

Chapter 5, Service and Support. Provides information on contacting your
Adyen N.V. representative or service provider and information on how to order accessories or documentation from Adyen N.V..

Chapter 6, Troubleshooting Guidelines. Provides troubleshooting guidelines
should you encounter a problem in terminal installation and configuration.

Related Documentation

To learn more Adyen SFO1, refer to the following set of documents:

- Adyen SFO1 *Physical Security Features*
- Adyen SFO1 *Firmware API Specifications*
- Adyen SFO1 *Software Design Specifications*

CONVENTIONS

Various conventions are used to help you quickly identify special formatting. Table 1 describes these conventions and provides examples of their use.

Table 1   Document Conventions

Convention	Meaning	Example
Blue	Text in blue indicates terms thatare cross references.	See Guide Conventions
Italics	Italic typeface indicates book titles or emphasis.	You *must* not use this unit underwater.
	The Information icon is used to highlight important information.	Adyen SFO1 is using USB communication
	The caution symbol indicates hardware or Software failure, or loss of data.	The unit is not waterproof or dustproof, and is intended for indoor use only.
	The warning symbol is used as a warning when bodily injury might occur.	Due to risk of shock do not use the terminal near water.

Overview

This chapter provides a brief description of Adyen N.V.'s SFO1 device.

Adyen SFO1

The SFO1 unit is an integrated countertop Point-of-Interaction terminal with 8-inch display with capacitive touch screen. The SFO1 offer an integrated smart, magnetic stripe and contactless card reader, offering advanced security and payment processing capabilities to handle credit and debit card transactions in an attended or semi-attended environment.

Adyen SFO1 supports both symmetric encryption algorithms (DES, 3DES, and AES) and asymmetric encryption (RSA and ECC). This device internally manages simultaneous multiple keys through either Master Session- or DUKPT-based processes, and offers high performance smart card processing, as well as support for the new generation of 3-volt cards.
The Adyen SFO1 sleek and stylish ergonomic design offers power and performance in a smart card and Contactless PIN pad device.

ℹ	Adeyn N.V. ships variants of Adyen SFO1 unit for different markets. Your unit may have a different configuration. However, the basic processes described in this guide remain the same, regardless of configuration.

Figure 1

Features At a Glance

• **Security** architecture meets specifications for PIN-entry devices (PED) and sophisticated **file authentication**.

The Adyen SFO1 provides the right combination of features and functions for countertop device. This includes a contactless card reader, smart card reader, an integrated PIN pad, and an WiFi and 4G wireless mobile.

Features and Benefits

Exceptional Ease of Use
• Modern and stylish design
• Intuitive interface
• Highly readable display handles multiple languages.

Critical Security Protection
• Incorporates tamper-detection circuitry to resist unauthorized intrusion and supports a broad spectrum of hardware and software-based security features.
• Integrated security modules simultaneously support sophisticated encryption (AES, DES, 3DES, RSA, ECC) and key management schemes.

Strong Feature Set
• Primary smart card reader support for synchronous and asynchronous smart cards.
• SFO1 has received PCI PTS 6.2 SRED Security Certification.

Device Specifications

Processor for payment and security functions	**ARM Cortex® M4 Security Microcontroller**
Memory	• 1MB Internal RAM • 8MB External Serial Flash
Processor for Android OS	Quad-Core ARM Cortex-A53 64-bit
Memory	• 32GB Flash • 3GB LPDDR4x RAM
Main Display	• Type - IPS • Colors – 16.7M • Size 8 inch • Resolution – 800 x 1280 • Backlight • Capacitive touchscreen • E-Privacy (Private Mode)
Smart Card Reader	ISO7816, EMV L1 certified
Contactless Card Reader for payment applications	• AMEX ExpressPay • Discover D-PAS • MasterCard Contactless • VISA PayWave • China Union Pay • JCB
Contactless Card Reader	• NFC-A/ISO 14443 Type-A • NFC-B/ISO 14443 Type-B • NFC-F/Felica • NFC-V/ISO 15693
Camera	• Main - 5 MP
Battery(only for back up)	Rechargeable lithium-ion polymer battery 3.7V, 180 mAh
Connectivity	• USB - Device - Host • WLAN - 2.4G/5G, 802.11 a/b/g/n/ac • Wireless mobile Data for China version: - LTE FDD Band 1, 3, 5, 8 - LTE TDD Band 34, 38, 39, 40, 41 - WCDMA Band 1, 8 - EVDO/CDMA BC0 - GSM/EDGE DSC 1800, E-GSM 900 • Wireless mobile Data for Europe version: - LTE FDD Band 1, 2, 3, 4, 5, 7, 8, 20, 28 - LTE TDD Band 38, 40, 41 - WCDMA Band 1, 2, 4, 5, 8 - GSM/EDGE PCS 1900, DSC 1800, GSM 850, E-GSM 900 • Wireless mobile Data for North America version: - LTE FDD Band 2, 4, 5, 7, 12, 13, 14, 17, 25, 26, 66, 71 - LTE TDD Band 41

	• Wireless mobile Data for Japan version: - LTE FDD Band 1, 3, 5, 8, 11, 18, 19, 21, 26, 28 - LTE TDD Band 41 - WCDMA Band 1, 6, 8, 19 • ESIM • GNSS; GPS, BDS, GLONASS, Galileo, QZSS, SBAS, L1, NaviC* *Only for North America version
Audio features	• Electro-Magnetic Buzzer • 2 x Speakers • 3.5mm Audio Jack
Sensors	• Ambient light sensor
Buttons	• Power button
OS	Android 13
Reliability	• 500 000 chip card cycles • 1 000 000 magnetic card swipes
Certifications	PCI PTS 6.2
Dimensions (LxWxH), mm	144.4 x 203 x 18.5
Weight, g	
Environmental	Operating: -20°C to +55°C / 35 to 85% RH Storage: -30°C to +70°C / 20 to 90% RH
Power Supply	• 5V/12V through USB-C (USB PD)

Device Operation
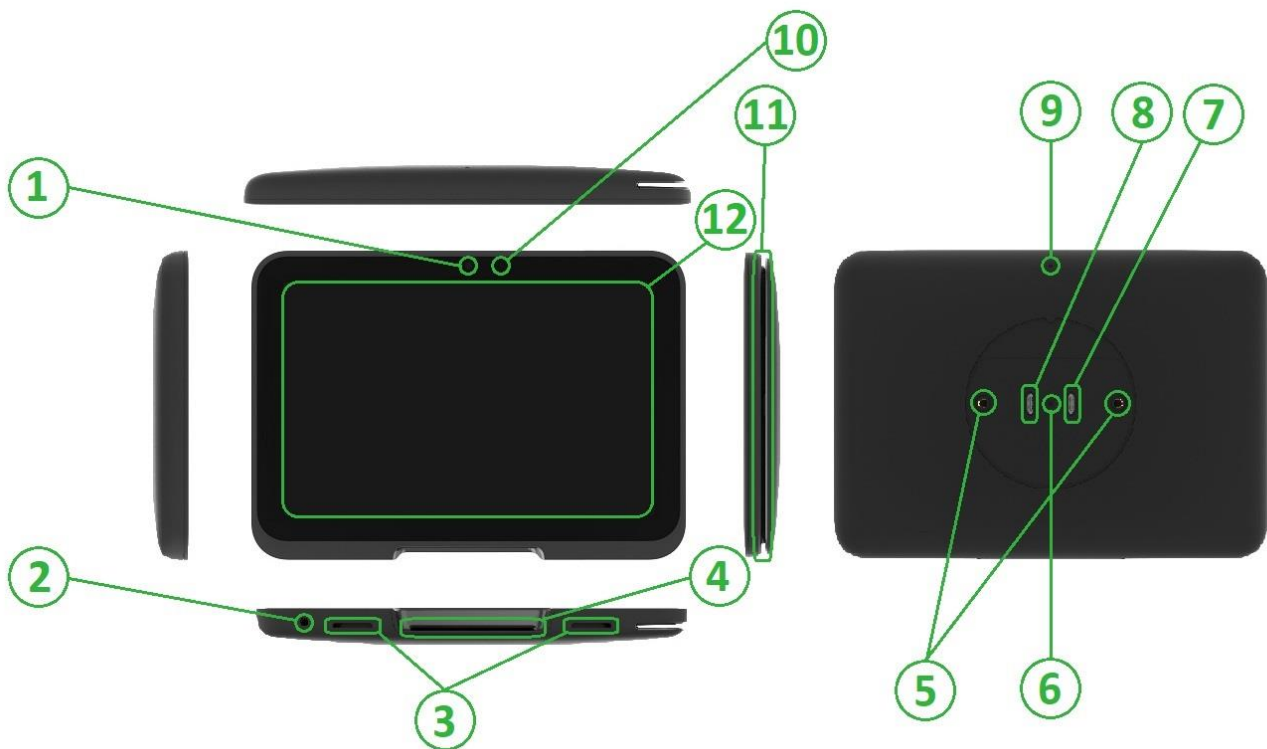
Figure 2

1. Front Camera
2. Audio Jack 3.5mm
3. Speakers
4. Chip chard reader and LED indication
5. Screw posts for stand mounting
6. Power button
7. USB connector 1
8. USB connector 2
9. Opening for reset button
10. Ambient Light Sensor and Proximity Sensor
11. Magnetic Card Reader
12. Main display and touch screen/Contactless Card Reader

GETTING STARTED

SFO1 is designed to work only with attached power supply. This can be done via providing power to one of the USB connectors.

Setup

SFO1 has several USB communication modes.
- "File Transfer"
- "USB tethering"
- "MIDI"
- "PTP"
- "No data transfer"

COMMUNICATION PARAMETERS with Secure processor (Service Functions)

For communication with secure processor, please use only USB connector 1 and connect special service cable. "APPLICATION DOWNLOAD MODE" and "SYSTEM MODE" are accessible only through USB connector 1.

APPLICATION DOWNLOAD MODE

To enter in application download mode on the SFO1, must be used the special service cable.
Must be hold the power button on special service cable. Release the button after characteristic sound (first beep) is played. In this mode can be update Firmware or Application of Secure Processor.

SYSTEM MODE

To enter in system mode on the SFO1, must be used the special service cable.
Must be hold power button on special service cable. Release the button after characteristic sound (second beep) is played. System mode is for key management.

UPDATING SECURE PROCESSOR FIRMWARE/APPLICATION

Firmware and application on Secure processor can be updated via Android application.

UPDATING Application processor FIRMWARE

Application processor firmware can be updated via OTA.

SOFTWARE VERSIONS

The product software version of Application processor can be retrieved using Android settings menu. From main screen by pressing "Settings"->"General"->"About Phone":

Figure 3

Android version
Software version
Build number

The product firmware and/or application versions of Security processor can be retrieved using Android settings menu. From main screen by pressing "Settings"->"General"->"About Phone"->"Pinpad information":
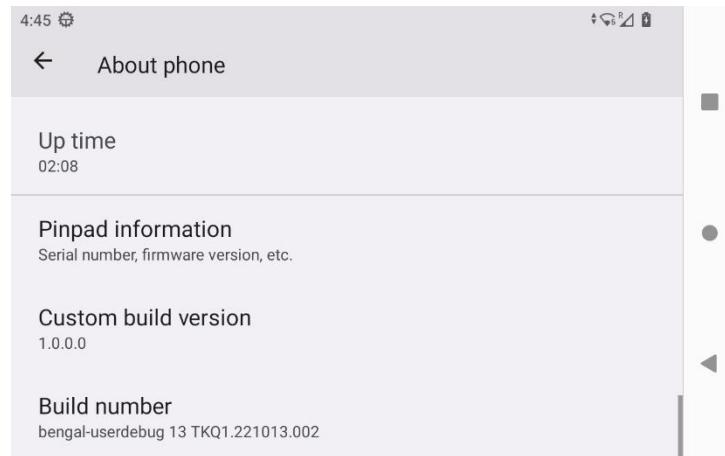

Figure 4

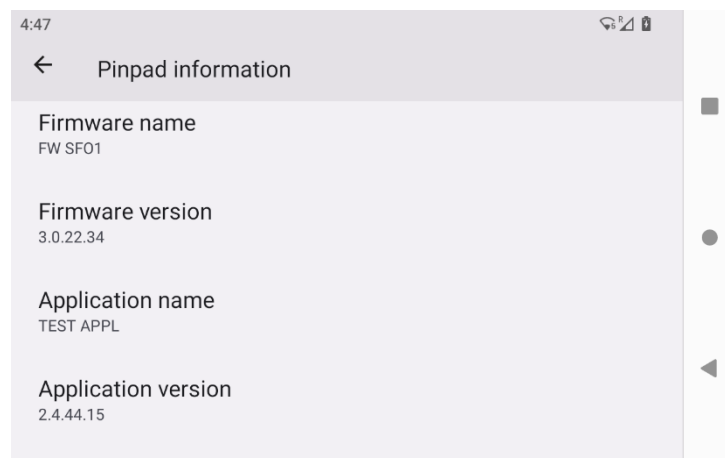**Status** of the Secure processor On/Off

Serial Number of the device

CPU serial number – USIP serial number

Capabilities of the device

Firmware name of the loaded FW

Firmware version of the loaded FW

Application name of the loaded AP

Application version of the loaded AP

Firmware key version

Application key version

Loader key version

Hardware version

Smart Card Reader Use

The smart card transaction procedure can vary depending on the application loaded on the SFO1. Verify the proper procedure with your application provider before performing a smart card transaction.

To Conduct a Smart Card Transaction

1 Position a smart card with the gold contacts facing upward (Figure 5).
2 Insert it into the ICC card reader slot in a smooth, continuous motion until it seats firmly.
3 Remove the card when the display indicates the transaction is completed.

Figure 5

⚠️	Leave the smart card in the card reader until the transaction is completed. Premature removal can void the transaction.

Contactless Card Reading

The contactless card transaction procedure can vary depending on the application loaded on the SFO1. Verify the proper procedure with your application provider before performing a contactless card transaction.

To Conduct a Contactless Credit/Debit Card Transaction

1. Place a contactless card to shown on the SFO1 display contactless logo (Figure 6).
2. Remove the card when the display indicates the transaction is completed.
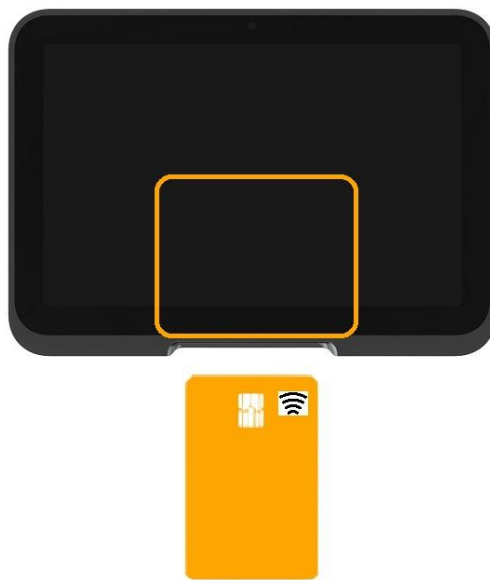

Figure 6

Magnetic Card Reader Use

The magnetic card transaction procedure can vary depending on the application loaded on the SFO1. Verify the proper procedure with your application provider before performing a magnetic card transaction.

To Conduct a Magnetic Credit/Debit Card Transaction

1 Position a magnetic card with the stripe facing down (Figure 7).
2 Insert it into the MS card reader slot and then quickly swipe it.
3 Hand SFO1 to the customer for signature or PIN entry
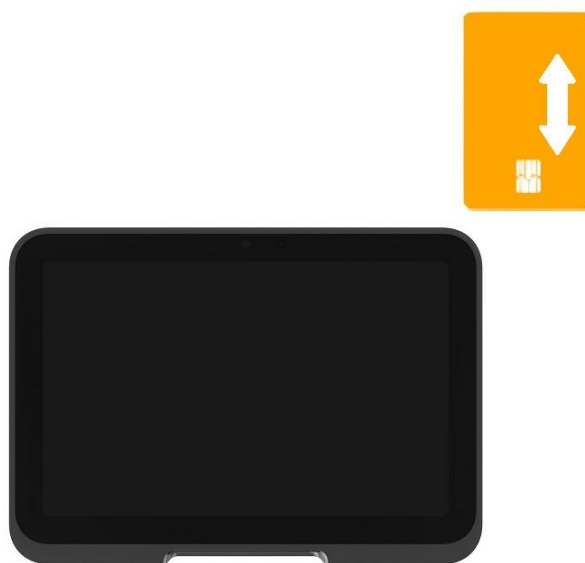

Figure 7

Troubleshooting Guidelines

This chapter lists typical examples of malfunction you may encounter while operating your SFO1 unit and steps you can take to resolve them.

The troubleshooting guidelines provided in the following section are included to assist successful installation and configuration of SFO1 units. If you are having problems operating your SFO1 unit, please read through these troubleshooting examples. If the problem persists even after performing the outlined guidelines or if the problem is not described, contact your local Adyen N.V. representative for assistance.

ℹ	The SFO1 unit contains no user-serviceable parts. Do not, under any circumstance, attempt to disassemble the unit. Perform only those adjustments or repairs specified in this guide. For all other services, contact your local Adyen N.V. service provider. Service conducted by parties other than authorized Adyen N.V. representatives may void any warranty.

Blank Display

When the SFO1 unit display does not show correct or clearly readable information:
• Check the attached power supply.
• If the problem persists, contact your local Adyen N.V. service provider.

Touchscreen Does Not Respond

If the touchscreen does not respond properly:
• Check the display. If it displays is not blank, follow the steps outlined in Transactions Fail To Process.
• If the problem persists, contact your local Adyen N.V. representative.

Transactions Fail To Process

There are several possible reasons why the unit may not be processing transactions. Use the following steps to troubleshoot failures.

Check Smart Card Reader

• Perform a test transaction using several different smart cards to ensure the problem is not a defective card.
• Ensure that the card is inserted correctly (see Smart Card Reader Use).
• If the problem persists, contact your local Adyen N.V. representative.

Maintenance and Cleaning

SFO1 units have no user-serviceable parts.

To clean the unit, use a clean cloth slightly dampened with water and a drop or two of mild soap. For stubborn stains, use alcohol or an alcohol-based cleaner.

Do not attempt to clean the card readers. Doing so can void any warranty. For card reader service, contact your Adyen N.V. distributor or service provider.

⚠️	Never use thinner, trichloroethylene, or ketone-based solvents – they can deteriorate plastic or rubber parts. Do not spray cleaners or other solutions directly onto the display.

Battery replacement

For replacing the battery of SFO1 please contact with your local Adyen N.V. representative or service provider.

Safety

• To prevent damage to your device's parts or internal circuits, do not use it in dusty, smoky, damp, or dirty environments or near magnetic fields.

• Using an unapproved or incompatible power adapter, charger, or battery may damage your device, shorten its lifespan, or cause a fire, explosion, or other hazards.

• Keep the device and battery away from excessive heat and direct sunlight. Do not place them on or in heating devices, such as microwave ovens, stoves, or radiators.

• Dispose the battery, and accessories according to local regulations. They should not be disposed of in normal household waste. Improper battery use may lead to fire, explosion, or other hazards.

• Do not use, store or transport the device where flammables or explosives are stored (in a gas station, oil depot, or chemical plant, for example). Using your device in these environments increases the risk of explosion or fire.

Service and Support

For SFO1 problems, product service, and repair information, contact your local Adyen N.V. representative or service provider.

• International – Contact your local Adyen N.V. distributor

Service Returns

All customers, please contact your local Adyen N.V. representative or distributor for assistance with your service, return, or replacement.