PRODUCT MANUAL

YONEO contactless innovation

an atos company

worldline
e-payment services

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About this book

This book provides product information about:

- YONEO and its accessories
- technical specifications
- security considerations
- approvals and certifications, including applicable environmental regulations
- YONEO parts list

Who should read this book

This book is intended for:

- anyone who will be installing a YONEO in a vending machine or other equipment
- field and service technicians using the service unit

Information from this book may be reused in other documentation such as a user guide

Introduction

The YONEO is an intelligent NFC reader for unattended payments without PIN, supporting a range of standards including EMV and Mifare. Smart design, including optional backlit TFT colour display, make for an enjoyable contactless payment experience. Small footprint – the reader complies with EVA standards – plus onboard Ethernet and serial interfaces make integration in the vending machine simple and intuitive.

The YONEO is PCI 3.x and SRED/Open Protocols certified. It has been designed to run an almost unlimited number of applications and provide a complete solution for EMV payments.

The YONEO can be integrated with:

- a hybrid card reader (XENOA ECO), for low value/unattended payments where no PIN is required
- a PIN pad (XENTEO/XENTEO ECO module), for transactions where a PIN is required for card verification

Compact and versatile

The YONEO takes up almost no space inside the vending machine: compare this with the footprint of a bank note acceptor (BNA) or coin detector.

Typical integration scenarios for the YONEO include:

- vending machines/kiosks
- petrol forecourts (stand-alone configuration)
- on-street and off-street parking
- dispensers and pre-payment meters
- self-service checkouts

Variants

The YONEO is available with or without a TFT 64K colour display. The display size is 320 x 240 pixels, 2.2 inches.

Figure 1. YONEO with and without TFT colour display

Technical specifications

This chapter provides a summary of the technical specifications, followed by additional information on:

- external interfaces
- System-on-Chip ASIC
- customisation options

Size and weight

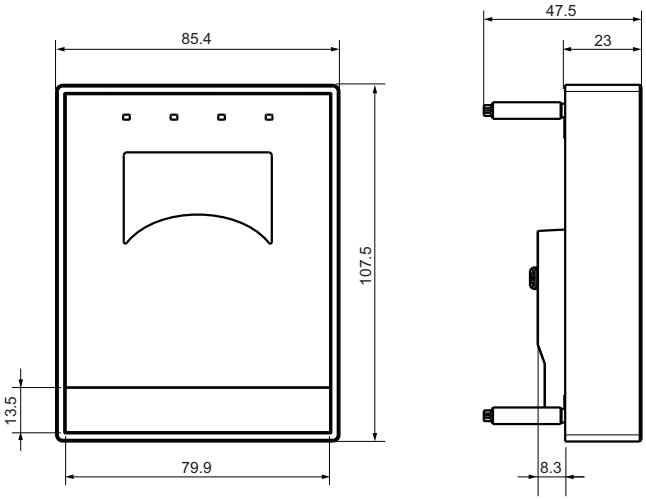

Figure 2. General dimensions

- size 107.5 x 85.4 x 23 mm (h x w x d)
- weight: 200g

Integration dimensions – built-in configuration

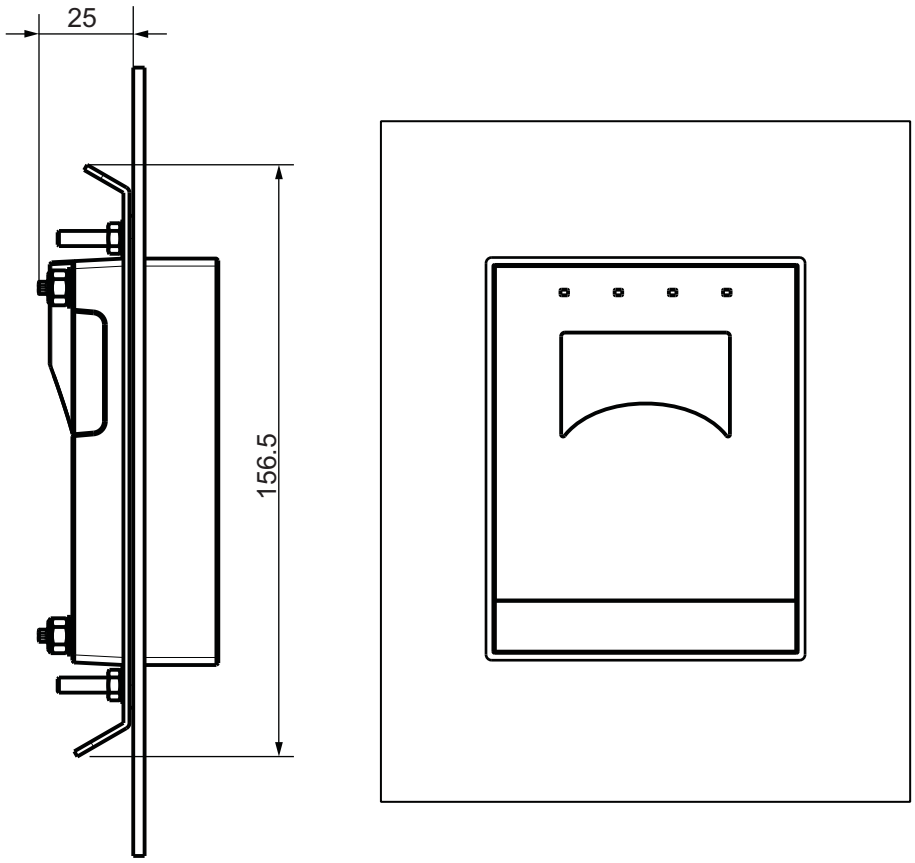

Figure 3. Internal mounting details for YONEO – built-in configuration

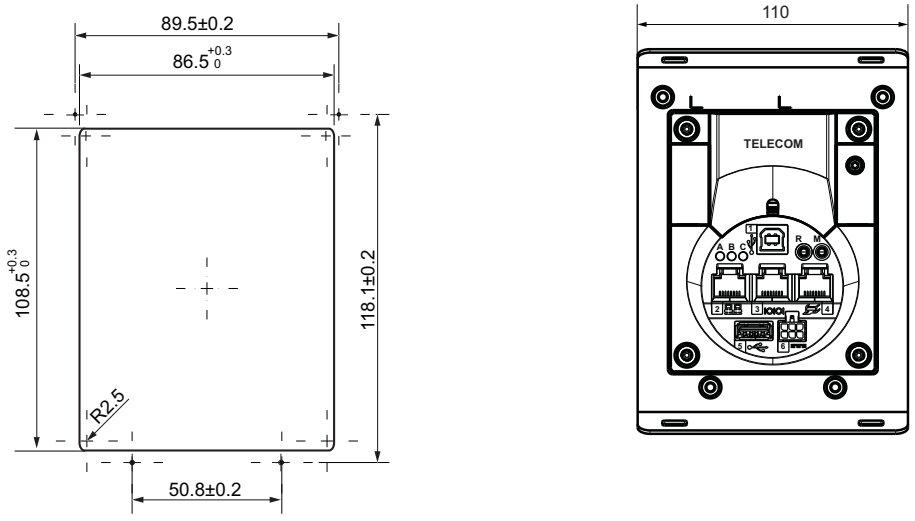

Figure 4. Front panel opening for YONEO – built-in configuration

Integration dimensions – surface-mounted configuration

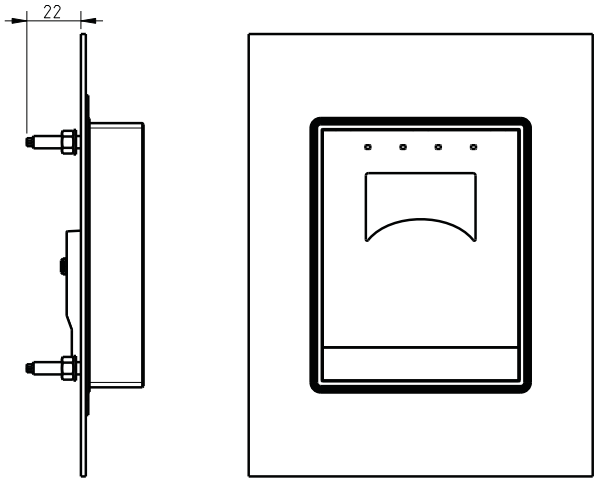

Figure 5. Front/side view for YONEO – surface-mounted configuration

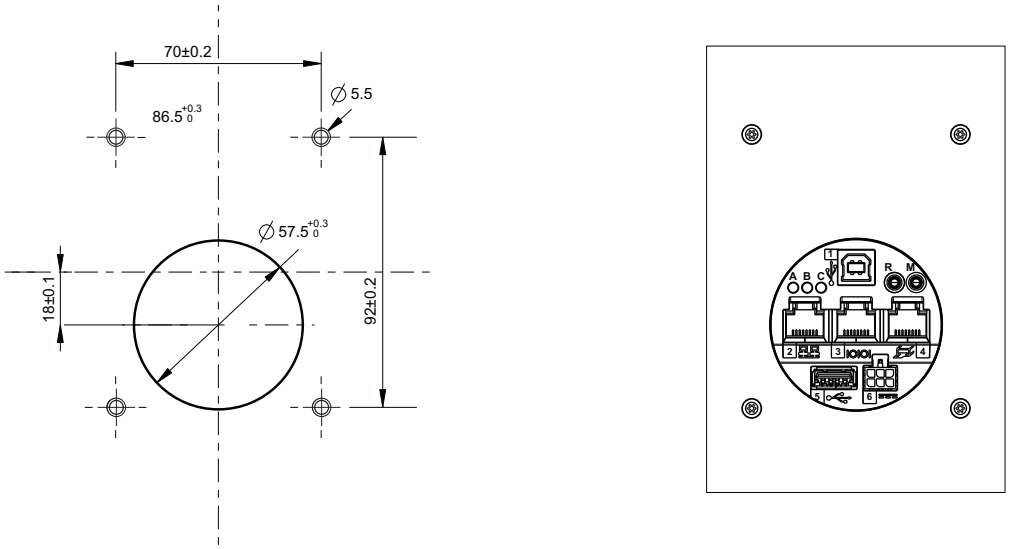

Figure 6. Front panel opening for YONEO – surface-mounted configuration

External interfaces

There are six sockets available for connecting the YONEO to external peripherals. The picture below shows the sockets and LEDs in the connector area at the back of the YONEO

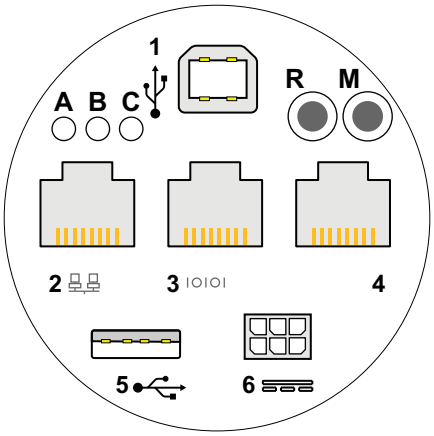

Figure 7. Indicators, connectors and controls

1 USB device

USB 2.0 Full Speed (12MBit/sec) device interface, which can be used to connect to ePOS equipment/PC and to perform key loading.

2 Ethernet

Ethernet connection 10/100 Mbit, using an RJ45 connector.

3 RS-232

RS-232 port with RTS/CTS flow-control, for connecting to peripherals such as ePOS equipment or a printer. The port allows connections up to 115,200 bps and is fitted with an 8p RJ45 connector.
This port can also be used to power up the terminal.

4 RS-485

RS-485 port, which can be used to connect an external hybrid card reader. The port consists of a RS485 half duplex communication pair used for transmission and reception of data. It is fitted with an RJ45 (8p/8c) connector.

5 USB host

USB 2.0 full speed (12MBit/sec) host interface, which can be used to connected to a USB stick or other storage device.

6 TTL

TTL connector Microfit 43045, providing power supply, one output and up to three inputs: used to attach a peripheral to the terminal

status LEDs

three status LEDs indicate the status of the YONEO

Reset button

The reset button is used to reset the terminal without unplugging the power. For application developers, it provides an easy way of rebooting the terminal. The reset button is slightly recessed to prevent accidental use.

Menu button

The menu button can be used to activate a menu on the payment terminal, for example to check settings.

Contactless reader

The YONEO contactless reader is ergonomically-designed and supports fast, fully secure payments with contactless cards and devices of all signalling schemes defined in the ISO14443 standard.

Figure 8. Front view	
1	single lit LED – contactless field active
2	three flashing LEDs – card reading in progress
3	illuminated landing zone (driven by application) for contactless devices
4	sticker area for indicating supported brands

The landing zone for contactless payment is:

- illuminated, easily recognizable and accessible
- marked by the contactless symbol

The contactless symbol is placed where the signal is strongest, and shows the "landing zone" where customers should tap the card or device

Operating the contactless reader

YONEO is designed for NFC operation, where cards/devices may be tapped on the front of the terminal. It can communicate with cards up to 40mm from the reader, in line with the EMV standard.

Other characteristics include:

- contactless communication in 13.56MHz band
- contactless communication up to 424kbit/s
- ISO/IEC 14443A
- ISO/IEC 14443B
- MIFARE classic/desfire
- FeliCa
- ISO/IEC 18092 NFCIP-1
- integrated LEDs indicate transaction progress

The YONEO offers card holders the real “tap & go” experience. Thanks to the powerful antenna in the terminal, the contactless device only has to be held near the landing zone.

Software engines for contactless transactions

The MasterCard PayPass and the Visa payWave engines are available. Other engines, for example American Express ExpressPay, can be provided on customer request. Specific contactless applications are developed locally, since they deal with communications between terminal and host.

Security application Modules (SAM)

YONEO contains two internal chip card interfaces (type ID0) for security application modules (SAM). Both 3V and 5V SAMs can be read. Standard current provided to the SAMs is 55 mA.

To reach the SAM slots, the telecom cover needs to be opened.

System on chip ASIC

The system-on-chip engine for the new generation of terminals from Worldline is a high-tech Application Specific Integrated Circuit (ASIC)

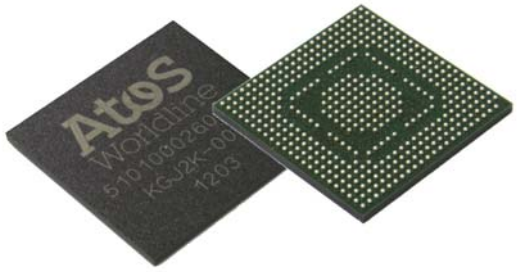

Figure 9. Worldline Application Specific Integrated Circuit (ASIC)

The system-on-chip engine for the new generation of terminals from Worldline is a high-tech Application Specific Integrated Circuit (ASIC). For the YONEO, this single chip provides all essential features, including:

- 2 x 32 bit ARM926 EJS processor cores
  - security / communication core (MP1)
  - application / communication core (MP2)
- 64 MB RAM memory
- 128 MB NAND Flash memory
- real-time clock (RTC)
- hardware DES / 3-DES encryption device
- hardware RSA accelerator
- hardware Pseudo Random Generator (PRG)
- Linux operating system

Audio

YONEO is equipped with a buzzer for audible feedback to the user. It has been developed to generate monotone buzzer-sounds, but music and voice output are possible as well. Voice output needs low-level support, which is available on customer request.

Other features

security 3DES, AES and RSA encryption algorithms

DUKPT key management (other schemes available on request)
SSL (v3.0) additional security schemes available

power

power supply: 12 V, 2 A
different power management profiles can be used

software

Linux operating system
Linux-based development kit (C and Java)
secure remote download of software

hardware integration options

hardware integration kit
key-loading interface

communications and peripherals

standard Ethernet interface
1 x vending machine controller (RS232)
1 x vending machine controller (USB device)
1x USB host interface
1 x optional MDB interface peripheral
I/O available (1 out, 3 in)

Accessories

A number of optional accessories are available, to make the YONEO easier to use and integrate:

communication boards

Separate boards and external antennas are available for Bluetooth/WiFi, 2G and 2G/3G communications.
Only one board at a time can be fitted. Any extra communication board must be requested when ordering the YONEO.

debug cable and connector

To facilitate software development, a debug cable and connector is available. (this component is delivered as standard with a YONEO development terminal) The cable connects to the internal electronics of the terminal, making it possible to develop and validate a payment application on a PC before transferring it to the terminal.

MDB box

Figure 10. MDB box

- external accessory to power and connect YONEO via MDB protocol
- easy to install in machine, complies with EVA CVS standard for external dimensions of internal module
- 3 connections: RS232, Mini-fit TTL, MDB TTL.

power adaptor

plug-in adaptor, 12V DC, 2A

Card basket

The terminal can be equipped with a basket which can hold a card or key during a transaction so that the user does not need to hold his card against the terminal all the time. This can be interesting for transaction times longer than 500ms, for example when a member of a closed user group wants to load a card.

Availability of this accessory depends on demand. Please check before ordering.

Figure 11. YONEO card basket

Development environment

Developing custom applications for the YONEO is supported by a development terminal and a complete software development kit (SDK).

SDK

The YONEO platform includes a professional, full-featured, Linux-based application development environment supporting both C and Java.

development frameworks

- backward-compatibility environment (SBCE), making it easy to port existing applications to YONEO
- application programming environment (MAPS) for Worldline System-on-Chip technology, for developing new applications that exploit the full functionality of YONEO

comprehensive set of development tools

C and Java development tools for MAPS and SBCE applications

comprehensive documentation

- description of the Application Programming Interfaces (API) for C and Java, for MAPS and SBCE
- introduction to the System-on-Chip hardware, software and security architecture
- interface design guidelines for System-on-Chip applications
- application development and porting guidelines

Approvals and norms

EMC emissions and immunity

EN61000-3

Electromagnetic compatibility (EMC) – Part 3, Testing and measurement techniques
Section 2, Limits for harmonic current emissions (equipment input current≦ 16A per phase)

EN61000-4

Electromagnetic compatibility – Part 4: Testing and measurement techniques
Section 3, Electromagnetic compatibility – conducted disturbances induced by radio-frequency field: Immunity test
Section 5, Surge immunity
Section 6, Immunity to conducted disturbances induced by radio-frequency fields
Section 8, Power frequency magnetic field: Immunity test

EN55022

Limits and methods of measurement of radio disturbance characteristics of ITE-equipment

ESD immunity

EN61000-4

Electromagnetic compatibility – Part 4: Testing and measurement techniques
Section 2: Electrostatic discharge immunity test

Voltage fluctuations and transient

EN61000-3

Electromagnetic compatibility – Part 3: Testing and measurement techniques
Section 3: Limitation of voltage fluctuations and flicker in low voltage supply systems for equipment with rate current ≦ 16A per phase

EN61000-4

Electromagnetic compatibility – Part 4: Testing and measurement techniques
Section 4: Electrical fast transient / burst immunity test
Section 11: Voltage dips, short interruptions and voltage variations immunity test

Safety

EN60950-1

Information technology equipment. Safety. General requirements

YONEO with GSM

EN301 489

Electromagnetic compatibility and radio spectrum matters (ERM); Electromagnetic compatibility (EMC) standard for radio equipment and services
Part 1: Common technical requirements
Part 7: Specific conditions for mobile and portable radio and ancillary equipment of digital cellular radio telecommunications systems (GSM and DCS)

EN301 511

Global system for mobile communications (GSM); Harmonized EN for mobile stations in the GSM 900 and GSM 1800 bands covering essential requirements of article 3.2 of the R&TTE directive (1999/5/EC)

YONEO with WLAN

EN301 489

Part 1: Common technical requirements
Part 17: Specific conditions for 2.4 GHz wideband transmission systems and 5 GHz high performance RLAN equipment

EN300 328

Electromagnetic compatibility and radio spectrum matters (ERM) Wideband transmission systems
Data transmission equipment operating in the 2.4 GHz ISM band and using wideband modulation techniques
Harmonised EN covering essential requirements under article 3.2 of the R&TTE directive

Operating certifications

- vandal-proof (IK07 with display; IK10 without display)
- water-proof (IP65 rating)
- flammability rating ANSI/UL 94 V-0
- RoHS2 Directive 2011/65/EU
- WEEE Directive 2002/96/EC

Operating conditions

The terminal is designed for unattended outdoor use.

temperature

- operating temperature for YONEO with display: -20°C to +60°C
- operating temperature for YONEO without display: -20°C to +70°C
- storage temperature: -25°C to +70°C

humidity

- operational humidity: 0 to 90% RH non-condensing
- storage humidity: 0 to 95% RH

Logistics information

This chapter provides:

- samples of labels for the YONEO terminal, accessories and packaging
- information on product packaging

Terminal label

Examples of product labels are provided to show what information is given on each label. Minor differences in layout may occur.

Figure 12. Terminal label

The YONEO terminal label shows:

- maker's name: Atos Worldline
- model name: YONEO
- article number, referring to the specific terminal hardware

  This number identifies the specific terminal hardware and customisations, and is used for certification purposes. It is not the same as the commercial article number mentioned on the packaging box, which is customer-specific.
- serial number:
  - human-readable, for example Serial N°: AZY3694
  - barcode
- production date in the format yywk, so 1331 for week 31 in 2013
- country of origin: Made in Singapore
- voltage and current: 12.0 VDC 2 A
- safety labels, for example CE
- WEEE-logo

MAC address label

Figure 13. MAC address label

The MAC address label contains communications and software information.

- MAC address, which can be
  - read from the barcode
  - consulted via software
- HW/ID made up from a four-character prefix – 424B in the example – followed by the hexadecimal MAC address – 00B81901805A in the example

  the full HW/ID is not provided as a single barcode
- HW (production) code, for example TT002

  this information can also be read from the barcode
- REV is the hardware revision code