Contactless Only Reader

COR

Approved by EW:	**Approved by PM:**	**Approved by QM:**
Date:	**Date:**	**Date:**
Signature:	**Signature:**	**Signature:**

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1 Purpose

This specification gives an operational description of the COR.

2 Scope

Customer, Integrators, Net Provider, (CCV-EW, SA, PM)

3 Terms and Abbreviations

BMP	Bitmap, pre-defined data field
COR	Contactless Only Reader
DK	Deutsche Kreditwirtschaft (formerly ZKA; http://www.die-deutsche-kreditwirtschaft.de/)
OPM	Outdoor Payment Module: This terminal is a multifunctional Terminal. It has no display or keyboard within the machine.
OPP	Outdoor PIN-Pad is a secure multifunctional terminal for installation in machine for indoor and outdoor use.
COR-Bxx	describes the contactless only reader combined with a chip reader
COR-Axx	describes the contactless only reader
OPP-C60s	OPP-C60$_{\text{Standard}}$ with front cut-off 199*140mm (OPP-A40/B50)
OPP-C60c	OPP-C60$_{\text{Compact}}$ with front cut-off 141*92mm
OPP-C60m	OPP-C60$_{\mathbf{7000}}$ with front cut-off 196*132mm
PM	Product Management
SA	Sales
SCR	Secure-Card-Reader
nWAKE	**n**egative **Wake**up signal (bidirectionally (input *and* output): Each connected MDB device can pull this line low to wakeup all other devices on the bus
EMC	Electromagnetic compatibility

4 Responsibilties

The Product Management group (PM) is accountable for the maintenance of this specification.

PM is also responsible to forward the included information (FCC NOTICE/ CONFIRMATION) to customers/ manufacturers who will install the OPP-C60/ OPM-C60 with COR and with optional SCR-C60 in their machines (vending machines, ticket machines, parking stations, petrol stations, …).

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5 Characteristics

5.1 FCC information

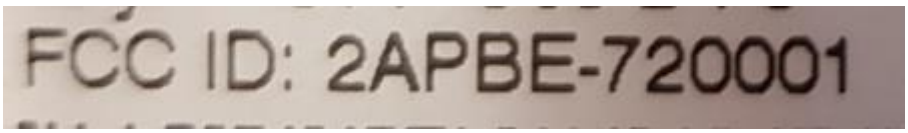
5.1.1 FCCID, Modelname

FCC ID: 2APBE-72001

Modelname: OPx-C60

5.1.2 FCC Label Artwork/ Placement

The FCC information (FCC ID and Modelname) is included at label with serial number at backside of OPP-C60/ OPM-C60 at position below the interface:



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5.2 FCC NOTICE/ CONFIRMATION

The transmitter (OPP-C60/ OPM-C60 with COR and with optional SCR-C60) will be supplied as an original equipment device to the manufacturer of the payment terminal/ of the vending machine/ ticketing machine.

According to the labelling requirements in 47 CFR Part 15 the terminal manufacturer/ manufacturer of vending machine/ ticketing machine has to add following text to the appropriate users manual for the terminal/ for the machine:

NOTICE:

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.

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.*

Changes or modifications made to this equipment not expressly approved by CCV Deutschland GmbH may void the FCC authorization to operate this equipment.

Radiofrequency radiation exposure Information:

The radiated output power of the device is far below the FCC radio frequency exposure limits. Nevertheless, the device should be used in such a manner that the potential for human contact during normal operation is minimized.

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5.3 FCC Manual Requirements according 15.105

5.3.1 Definitions

Digital device. (Previously defined as a computing device): An unintentional radiator (device or system) that generates and uses timing signals or pulses at a rate in excess of 9,000 pulses (cycles) per second and uses digital techniques; inclusive of telephone equipment that uses digital techniques or any device or system that generates and uses radio frequency energy for the purpose of performing data processing functions, such as electronic computations, operations, transformations, recording, filing, sorting, storage, retrieval, or transfer. A radio frequency device that is specifically subject to an emanation requirement in any other FCC Rule Part or an intentional radiator subject to Subpart C of this Part that contains a digital device is not subject to the standards for digital devices,

Class A digital device: A digital device that is marketed for use in a commercial, industrial or business environment, exclusive of a device which is marketed for use by the general public or is intended to be used in the home.

Class B digital device: A digital device that is marketed for use in a residential environment notwithstanding use in commercial, business and industrial environments. Examples of such devices include, but are not limited to, personal computers, calculators, and similar electronic devices that are marketed for use by the general public. Note: The responsible party may also qualify a device intended to be marketed in a commercial, business or industrial environment as a Class B device, and in fact is encouraged to do so, provided the device complies with the technical specifications for a Class B digital device. In the event that a particular type of device has been found to repeatedly cause harmful interference to radio communications, the Commission may classify such a digital device as a Class B digital device, regardless of its intended use.

5.3.2 Text for User Manual (blue cursive text)

For a Class A digital device or peripheral, the instructions furnished the user shall include the following or similar statement, placed in a prominent location in the text of the manual:

NOTE: *This equipment has been tested and found to comply with the limits for a Class A digital device, pursuant to Part 15 of the FCC Rules. These limits are designed to provide reasonable protection against harmful interference when the equipment is operated in a commercial environment. This equipment generates, uses, and can radiate radio frequency energy and, if not installed and used in accordance with the instruction manual, may cause harmful interference to radio communications. Operation of this equipment in a residential area is likely to cause harmful interference in which case the user will be required to correct the interference at his own expense.*

For a Class B digital device or peripheral, the instructions furnished the user shall include the following or similar statement, placed in a prominent location in the text of the manual:

NOTE: *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*

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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.*

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5.4 Safety Information

- The system handbook should be studied before integrating the product into vending machines, as this contains important information regarding installation.
- Damage resulting from not following the guidelines or from incorrect operation will void the guarantee. No liability will be accepted for any consequential damage.
- No liability will be accepted for damage or injury resulting from incorrect operation or from failure to observe the safety guidelines.
- Integration of the product may only be carried out of qualified by electrical specialists (i.e. electrician), according to the relevant regulations (i.e. VDE, CE).
- If you have no specialist knowledge regarding the installation, do not carry this out yourself. Installation should only be carried out by a qualified specialist.
- Never remove the power supply or the card-reader from terminal, whilst this is performing a payment or other active functions (i.e. display indication „please wait...“). Please contact your network provider if such a message appears for a longer period.
- Change the card-reader only if the power supply is disconnected.
- The terminal is certified for cashless payments in various countries, dependent on the network provider / acquirer. Operation outside of Germany is to be agreed in consultation with the relevant trade partner.
- Never try to open the terminal. Unauthorized opening leads to deletion of all secure data, activating the fraud function and setting the terminal out of order. This also voids the warranty.
- Never submerge the terminal in water, throw into fire or expose to high humidity. The device should be cleaned with a soft damp cloth. Do not use chemical cleaners.
- Repairs may only be performed by authorized agents of CCV.
- Do not expose the device to temperatures outside the approved limits.
- Keep sufficient distance to mobile phones and wireless devices because these may cause interference. This is not necessary for devices that are able to perform a contactless transaction (e.g. mobile with NFC interface).
- Please obtain regular information about available and/or necessary updates or product extensions (Hotline of your network operator).
- Following software updates, telephone installation changes, or other changes to the terminal the complete payment operation including closing should be tested.
- Damage to or removal of the identification labels and seals on the equipment will void your warranty.
- One mounting screw of the terminal must be connected with the grounding of the local electrical system. The grounding must not be connected to a floating ground or a phase (see chapter Installation Instructions.

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5.5 Important information for use

5.5.1 Important integrator co-operation obligations

- The installation instructions as described in the system manual must be followed, particularly in view of mechanical, electrical and operational guidelines (ESD-electrical grounding).

- Important! Please ensure that the terminal is connected, configured and tested so as to execute updates via remote maintenance server TKS. Please also ensure possibility that updates can be initiated via the vending machine interface or the network-provider. In installation lacking a network connection where remote maintenance is not possible, it must be ensured that the integrator carries out on-site updates using Terminal Supervisor 3 or USB and that additional costs will occur.

- It must be ensured that software tools (Terminal Supervisor 3, Updatempp, etc.) are regularly updated. The current versions are available from the CCV download server. (https://download.ccv-deutschland.de)

- CCV points out that regular operational and security relevant updates could be required. Not carrying out these updates can lead to loss of approval and/or malfunction. CCV notifies of necessary updates in an appropriate time of period via release-notes. The provision of updates during the guarantee period is free. CCV is not liable for malfunctions or damage caused by lack of maintenance updates or maintenance errors due to the customer.

- CCV supports you during the initial installation of the product into vending- or other machine, and recommends a joint check of your vending-machine/terminal integration on-site prior to piloting, so that typical problems can be eliminated in advance. Please contact you reseller or CCV directly for details of this.

- Following expiry of the warranty period it is possible to purchase software-updates or a part of a previously contracted software maintenance contract. Necessary updates are documented in the release-notes. Software-updates are generally only available for a fee. Further details are available in consultation with your sales partner.

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5.5.2 Cleaning Card Reader

Clean the reader regularly with a cleaning card to prevent read errors. The cleaning intervals depend on the frequency of use and on the ambient conditions. Please do not use chemical cleaners. For cleaning the front of the card reader please use a slightly damp cloth or antistatic cloth.

The following intervals should serve as a guideline:

- Indoor device: 1 * weekly
- Outdoor device: 1 * daily

5.5.3 Warranty

Caution: Do not try to repair or to open the terminals card reader. Opening the device will void the warranty. The device will be no longer functional and must be replaced.

In case of damage, please contact your service provider.

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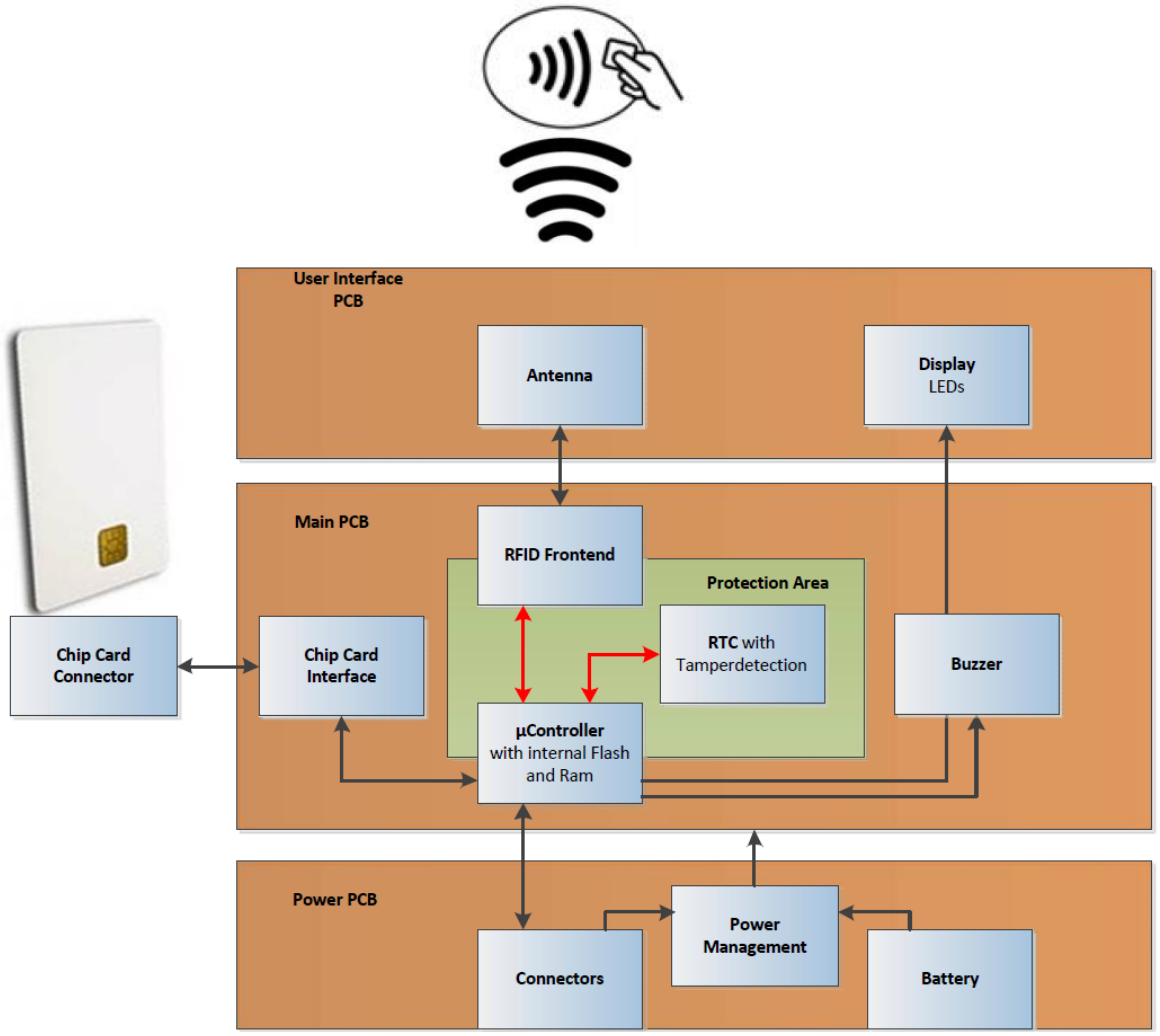
5.6 Block diagram COR



5.7 System description COR

The COR is a contactless ISO 14443 A/B card reader for payment applications with an optional ISO7816 card reader (ICCR only at version COR-B20).

The user feedback interface consists of a buzzer, LEDs in different colors and an optional monochrome graphical LCD (display only for versions COR-A20, COR-B20; no display for versions COR-A10, COR-A12).

The ports to the host system containing a RS-232 interface, an USB interface and a power Connection (RS232, USB, power in connected on the power-pcb/ = connector-pcb).

The battery is only used as a backup energy source for the tamper detection circuit as long as the main power is not available.

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The µcontroller with internal flash and RAM (Cortex STM32) and the RFID-frontend controller are assembled on the main-pcb with a pcb-encapsulation around these controllers (encapsulation protects secure signals according to PCI specification).

The antenna-pcb is directly soldered to the main-pcb (short connection from RFID-frontend of main-pcb to antenna-PCB without any additonal connector).

Any vending is started by users by any action on vending machine/ ticket machine.

The vending machine/ ticket machine starts payment by communication to OPP-C60/ OPM-C60.

The payment application on OPP-C60/ OPM-C60 can use the COR reader to manage contactless payments by contactless ISO 144443 A/B interface between COR antenna and contactless card (or NFC-application on smartphone) of the user who wants to pay for the vending process.

5.8 System description OPP-C60/ OPM-C60 with COR

The COR (Contactless Only Rader) is connected by RS232 or USB to a OPP-C60 or OPM-C60. The OPP-C60 and OPM-C60 use the COR (Reader) for reading cards for payment applications running in the OPP-C60/ OPM-C60.

The multifunctional OPP-C60 and OPM-C60 are as an evolution of the OPP-B50 tailor-made payment system for vending machines, tank machines, service machines and kiosk, where it is used as a compact and fully functional terminal. A more compact design is available as the OPP-C60 Compact, which requires a smaller installation footprint with the same functionality.

The multifunctional OPP-C60 consists of a separated card reader and a highly integrated PIN-Pad as the main device of the Systems. Next to the built-in LAN port, diverse communications can be realized via USB connections such as ISDN or GPRS. For this purpose the device does not even to be removed.

Otherwise, no more additional components are required in the machine (besides the card reader and receipt printer) the cost of integration in an automatic system is reduced to a minimum.

The elegant OPP-C60 with is front in vertically brushed stainless steel, a high resolution graphical LCD display and one for the purpose optimally tuned keyboard is based on a forward-looking hardware platform, the highest quality standards sufficient and due to their design offers a high level of security. It is vandal-resistant, weather resistant and can be used in an extended temperature range. The OPP-C60 is beside the Indoor use ideal for Outdoor use. The OPP-C60 Standard requires the same mounting cutout and the same mounting points as the OPP-A40 und OPP-B50. Therefore, it can be used by integrators easily.

The terminals are conforming to the requirements of ZKA TA7.1 trader terminals. As a pioneering hardware platform with extensive storage facilities it offers not only a variety of uses, but can also be updated at any time by a Software-Download to add new software features and functionality

The intelligent software update concept offers maximum reliability. To the very best service concepts (exp. Terminal supervisor and terminal management system TKS) were adopted at this point. Thus, it offers maximum investment security.

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5.9 User Interface

The COR is connected by RS232 or USB with the OPP-C60 or OPM-C60 (Users can only use interfaces to OPP or OPM; users do not have any direct control to COR).

The user of the OPP-C60 can get along easily with the terminals. The easy to use interface and the textual information on the big graphic display will help with it. The OPM-C60 can be comfortably administrated with the TS3 that can be downloaded for free.

The terminals can be used as unattended terminal (e.g. vending machine or petrol vending machine) and as attended terminal preferably in rough environments (extended temperature range, splash and vandalism).

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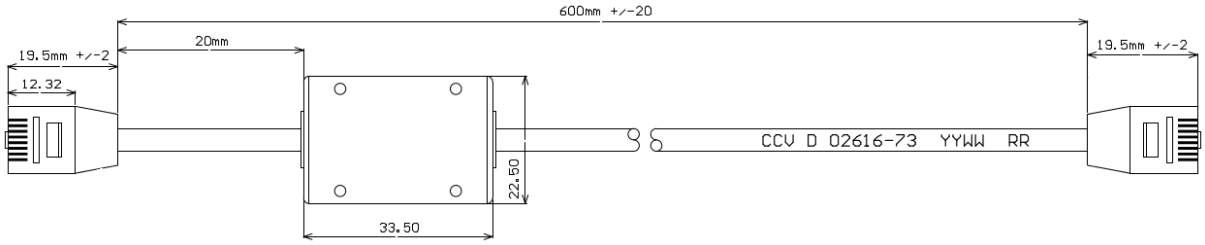
5.10 General technical information COR

5.10.1 Contacless reader COR

COR contactless readers can be used with the OPP-C60 and the OPM-C60. A certification is available for the combination OPP-C60 + COR-A10/12/20 and OPM-C60 + COR-A10/12/20 / COR-B20. **The OPP-C60 must not be used with COR-B20!** The OPM-C60 does **not require** a 4-eye-activation.

COR-A10/12 (contactless only)	COR-A20 (as A10 plus Display)	COR B20 (as A20 plus chip reader)

A cable with an infused ferrite can be found in the scope of supply. The following figure is showing the cable from OPP-C60 / OPM-C60 to the COR reader (the ferrite is infused in the cable part to the COR).



a) Description

SN	Designation	Name & Type	Qty
1	Connector	U.S. PLUG 8P8C, Molded Pantone orange 165, Gold Plated 3U	1
2	Cabel	PU Jacket, 28AWG PP*4C, Black Shiny	1

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3	Connector	U.S. PLUG 8P8C, Molded Pantone Yellow 107, Gold Plated 3U	1

b) Wire List

P1	Color	PIN OUT DETAILS	P2
1	White	V_IN-OUT	1
2	Black	GND	2
3	Red	<= RS232	3
4	Green	=> RS232	4
7	Blue	Wake UP	7
8	Blue	GND_IN-OUT	8

Note: All cables have to pass electrical test.

5.10.2 IP information of COR versions

The COR provides the following IP protection classes.

- COR-A10, -A12, -A20
  - front panel IP65
  - back panel IP20

- COR-B20
  - back panel IP20
  - front panel IP32
    - 3 = foreign object size > 2.5mm diameter cannot entry
    - 2 = water drops with 15° angle have no effects of damage

Further information on IP level of COR-B20

Water can entry to the backside of the COR reader (inside the vending machine) over the card slot. The contacting unit of the COR is opened at the bottom side to let foreign objects fall out or to let invaded water flow out (this is needed to prevent a blockade of the contacting unit).

There should be mounted a drain sheet inside the vending machine under the COR-B20 to shield the electronics under the COR-B20.

The openings at the backside of the COR housing for connector plugs or flexible connectors are mounted above the contacting unit. So there is no possibility for water drops to entry in this area to the COR electronics over the card slot.

Only spray water or hose water could entry over some corners. Depending on the location where the COR is used we recommend to provide a protection board to prevent the device from soiling or spray water.

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Information for the contacting unit of the COR-B20

- The contacting unit for the chip card is produced for 10 years in a large quantity. It is sophisticated very solid and is also used for outdoor applications.
- All materials of the contacting unit are water resistant (i.e. synthetics, high-grade steel, gold-plated contacts for contacting the chip and gold-plated contacts at the limit switch).
- There can only be problems with frozen contacts. If the card is put in more times the ice on the contacts will detach. For preventing the contacts of freezing we recommend to use a heating inside of the vending machine.

5.10.3 Viewing angle of the COR display (COR-A20, COR-B20)

Respecting the tolerances of the hardware components and the mounting tolerances the following max. viewing angle for the COR can be given.

- max. viewing angle from top / bottom about 17° to the display normal
- max. viewing angle from left / right about 50° to the display normal

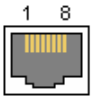
5.10.4 COR Interfaces

a) RS-232 Host Interface

High speed RS232 (default 115.2 kbps, switchable to 230.4, 460.8 or 921.6 kbps); RJ45; 8 pin shielded) without hardware handshake.

The RJ45 Connector is located at the bottom side of the COR and the maximum cable length is 100cm.

Pin	Signal
1	Vin (power supply)
2	GND
3	TxD (output)
4	RxD (input)
5	Not connected
6	Not connected
7	nWAKE (input/output)
8	Power GND



b) USB host interface

- USB 2.0 compatible, 12 MBps, USB function (slave)
- connector type: 5-pin Mini-B-Connector
- Power supply via RJ45 connector (VBUS not used for supply)

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- Automatic wakeup, if VBUS is present

c) Interface selection
- If VBUS is active (5V): USB interface is selected
- VBUS is inactive (0V): RS232 interface is selected
- Only one interface is active at a time

5.11 Certification

- ZKA TA7.1
- DC-POS 2.5 (also used with DC-POS 2.4)
- EMV2000 (EMV 4.0) Level 1 und Level 2
- PCI version 3.x and 5.x
- CE: Directive 2014/53/EU
- WEEE: Directive of the European Parliament and of the Council to reduce the electrical drop (WEEE 2002/96/EG)
- RoHS: Directive of the European Parliament and of the Council on the restriction of use of certain dangerous substances in electrical and electronic equipment (RoHS 2002/95/EG)
- FCC

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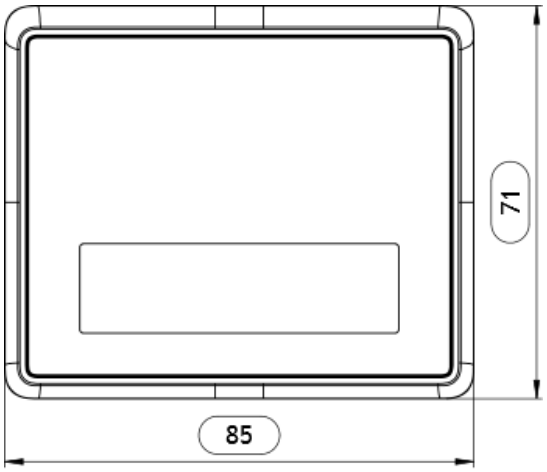
6 Technical Data

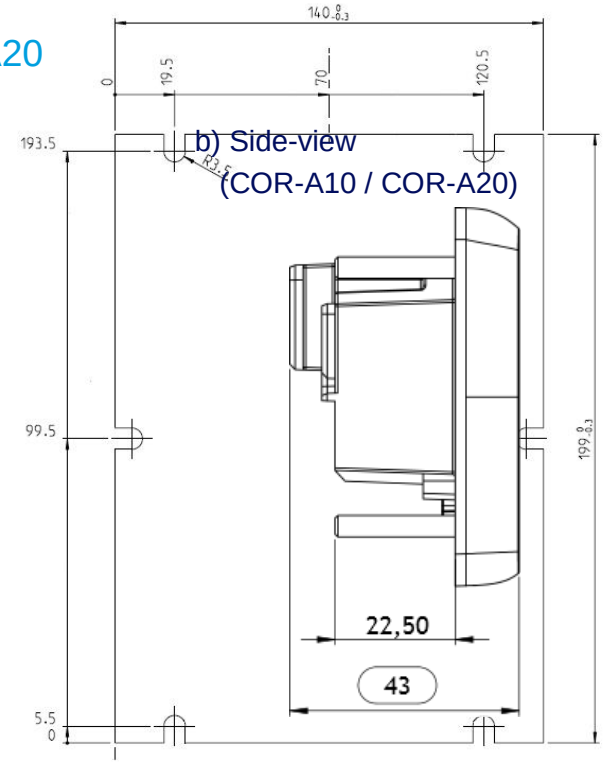
6.1 Images and Dimensions

6.1.1 Dimensions of COR-A10 / COR-A20

a) Front-view
(COR-A10 / COR-A20)



b) Side-view
(COR-A10 / COR-A20)



c) Rear-view of rear housing
(COR-A10 / COR-A20)

d) Top-view
(COR-A10 / COR-A20)

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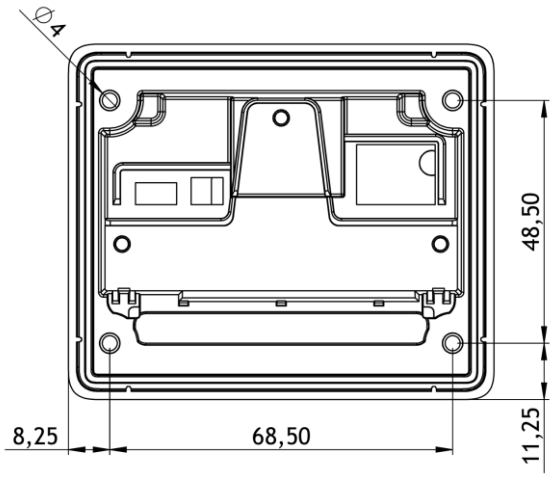
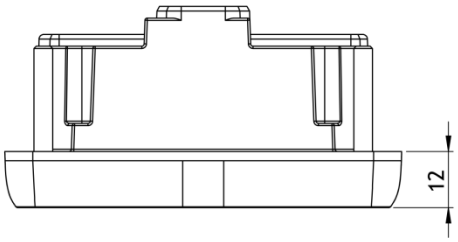
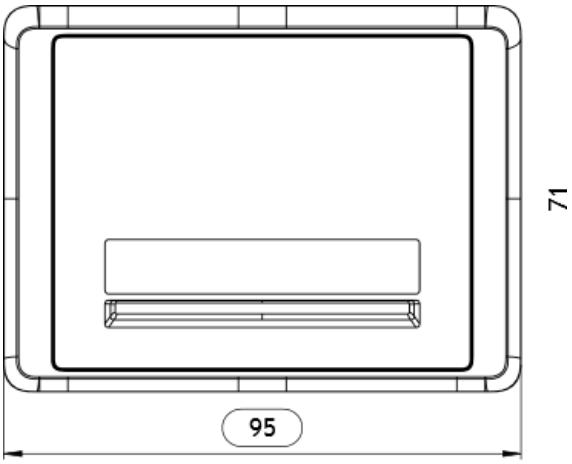


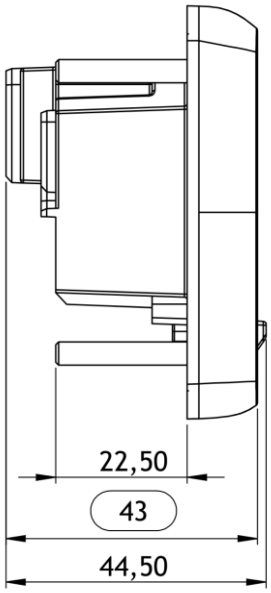


6.1.2 Dimensions of COR-A12

a) Front-view



b) Side-view



c) Rear-view of rear housing

d) Top-view

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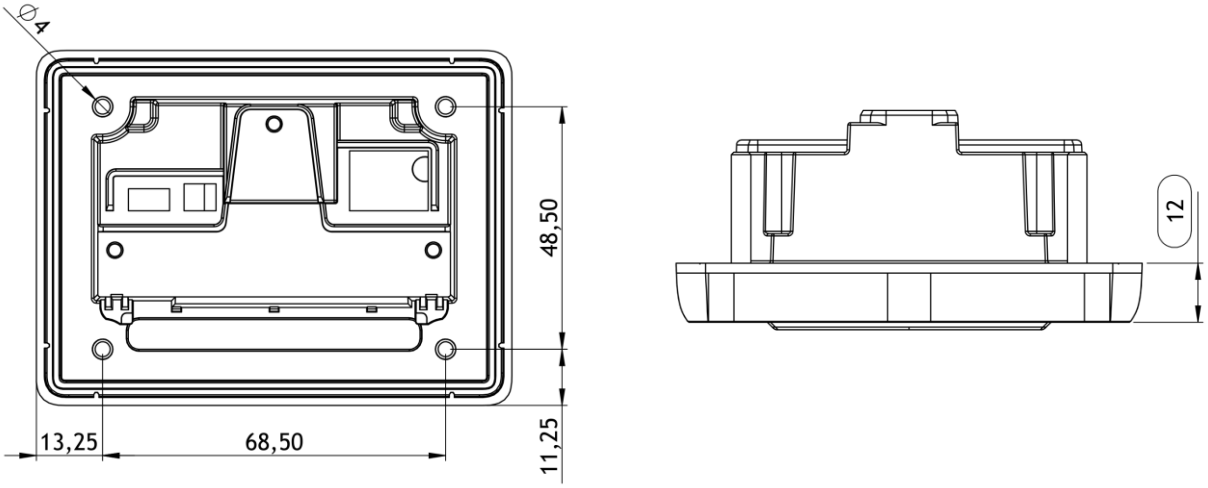
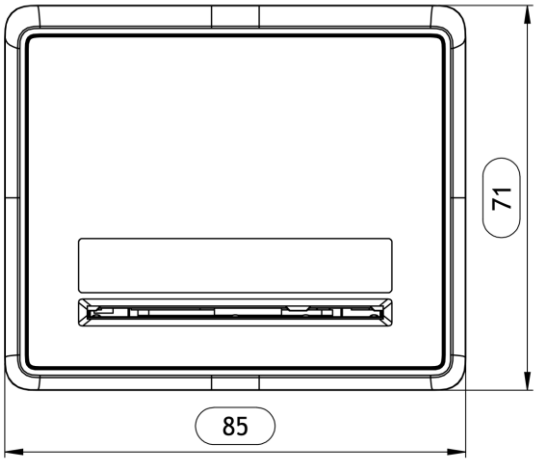
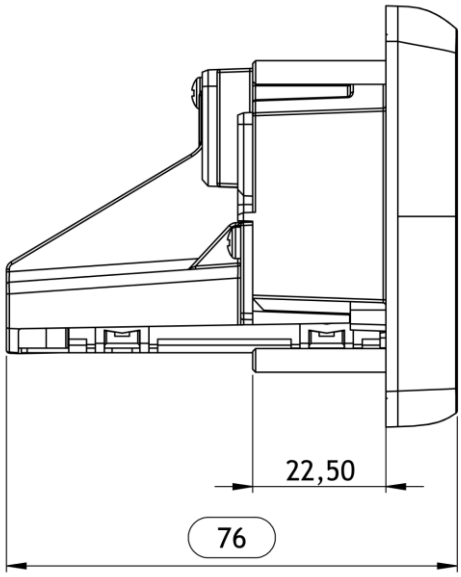


6.1.3 Dimensions of COR-B20

a) Front-view



b) Side-view



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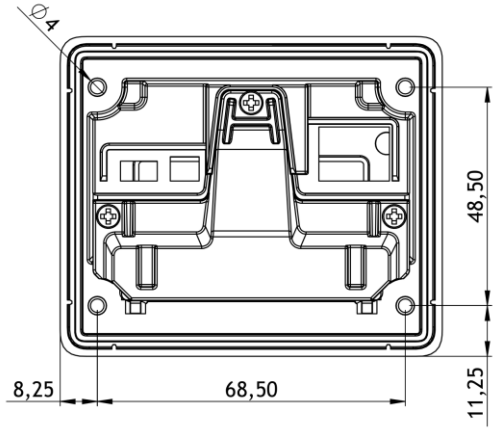
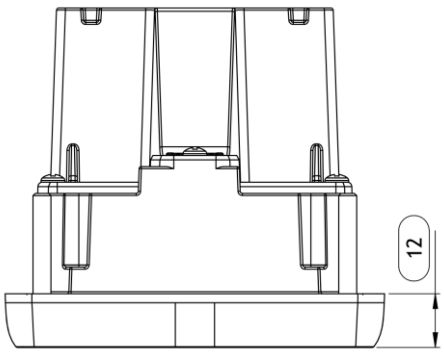
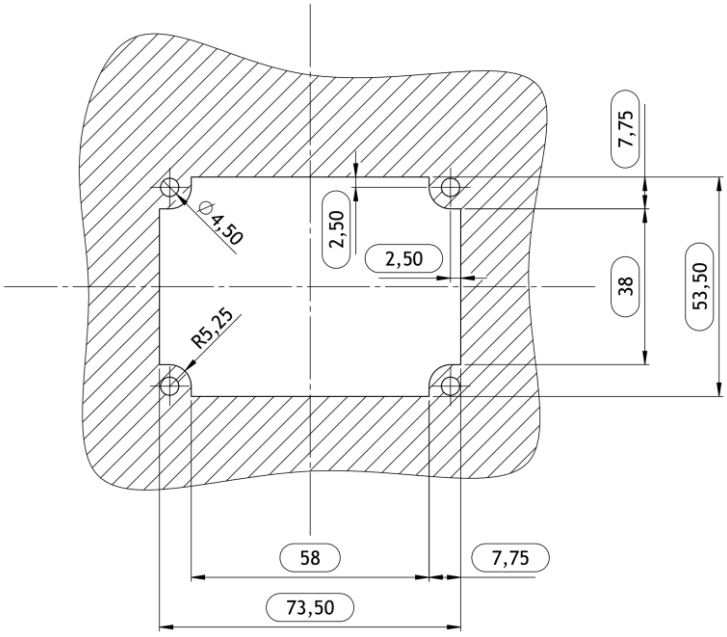
c) Rear-view of rear housing



d) Top-view



6.1.4 COR mounting cut-out



Integration information

COR:	attachment with 4 mounting nuts:	0,8Nm +/-0,2Nm

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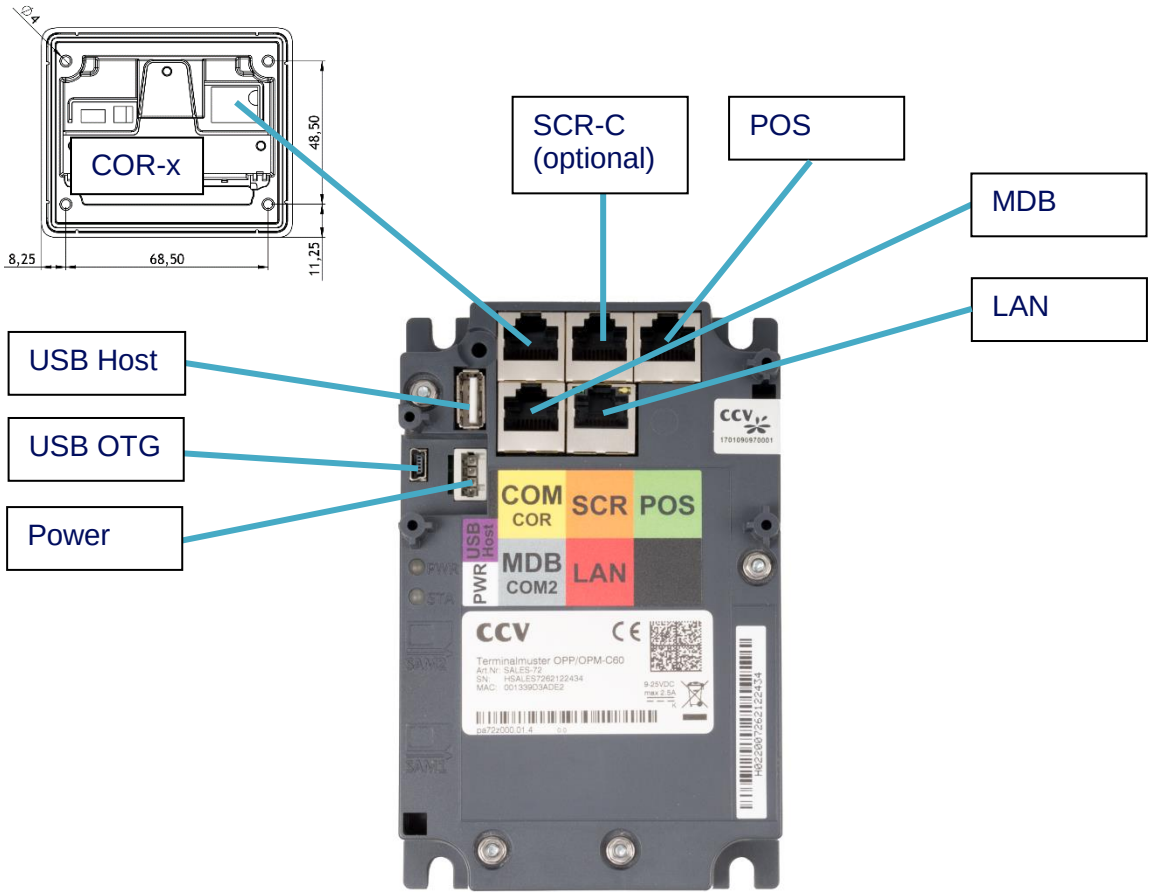
6.2 Interfaces

Connection: OPM-C60 with COR-x



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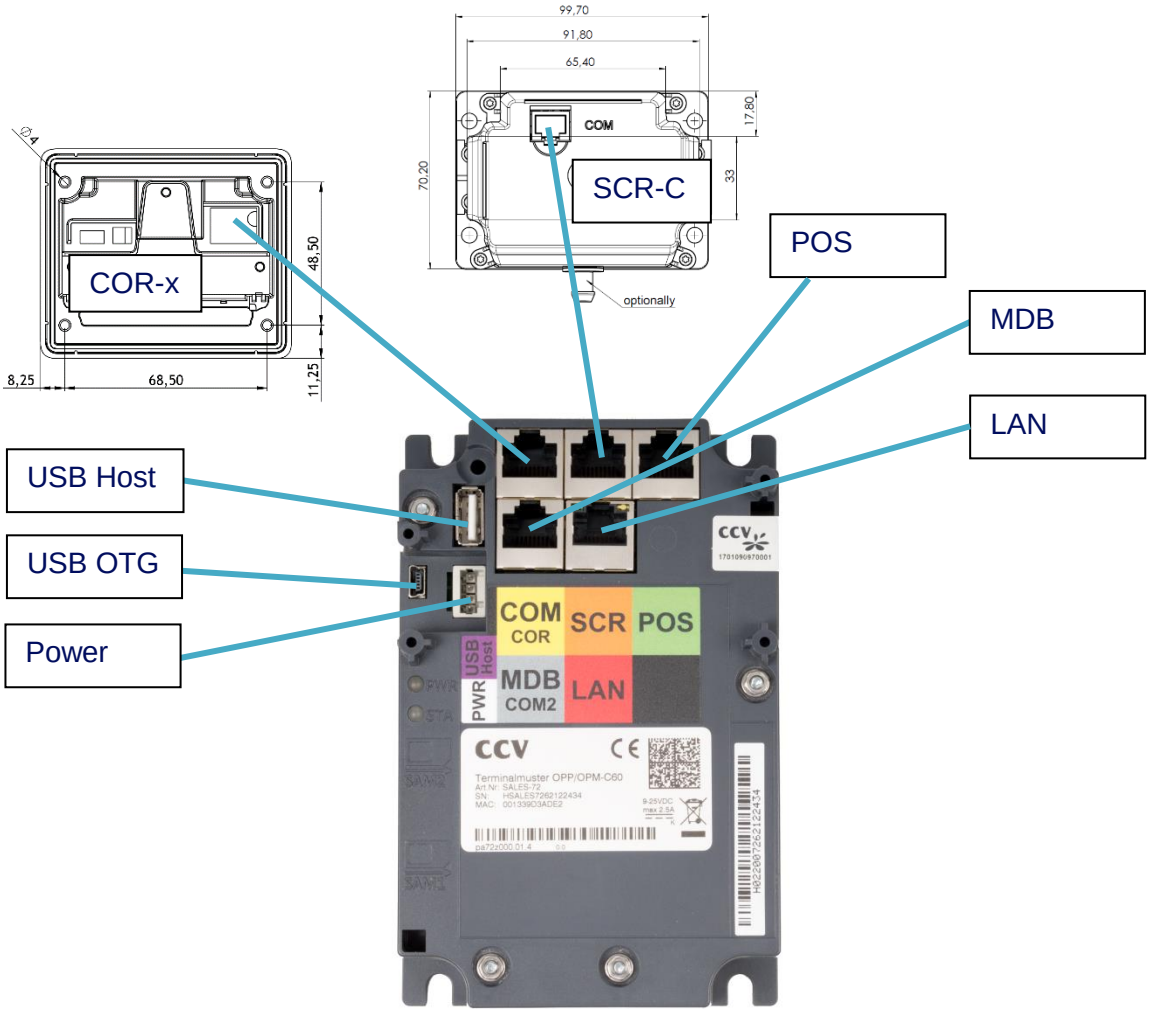
Connection: OPP-C60 with SCR-C60 and COR-Axx



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Note
The interfaces described below are not short-circuit proof!

6.3 Technical Data

6.3.1 COR

Temperature and environment (Operating, storage)	**Temperature conditions:** • operating: -25°C to +70°C (w/o heating) • storage: -30°C to +80°C • For long-time storage: +10°C to +30°C **Heating**: If heating is needed, the vending/ticket machine has to provide the power supply for it. **Humidity conditions**: operating: 5% - 90% RH (non-condensing) storage: 20% - 70% RH (non-condensing) **Electronic devices are coated** (w/o connectors)
Power consumption	- Active mode with no card (Irms current) 55mA@12VDC, 26°C - Active mode with card communication 200mA@12VDC, 26°C - Vin = 9 … 25V DC (via host connector), max. ripple ± 0.3 V - COR max. 500mA @ 12V (Current peaks at contactless communication!)
Vibration & Shock	**Vibration Test (DIN EN 60068-2-6; IEC 68-2-6):** 2Hz bis 9Hz/ 9Hz bis 200Hz; 10m/s²; 20 cycle in each direction (x, y, z); no damage **Shock Test (DIN EN 60068-2-27; IEC 68-2-27):** 18 Shock with 11ms pulse duration; max. acceleration 100m/s², (6 Shock in both directions); no damage
Power Management	**Low power design with wakeup:** - Wakeup by token presentation (capacitive proximity switch) - Wakeup by insertion of contacted card (COR-B20 only) - Wakeup by host (e.g. OPP, SCR, OPM): Bi-directionally wakeup line nWAKE via RS232 host connector: MDB compatible, COR output is a bipolar transistor with open collector (< 1V @ 10mA). COR input is active low (< 1V @ -1mA). External pull-up, e.g. 100kOhm to vending

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	machine supply voltage (9…45V), so nWAKE must withstand 45V. - Wakeup by USB interface (VBUS) Power-up time < 0.3s (measured from wakeup to 1st host command)
Min. Time BF	Min. 50.000h
Power Supply	Vin = 9 …25 V DC (via host connector), max. ripple ± 0.3 V
Certificates	• EMVCo L1 contactless type approval • EMVCo L1 contact type approval (COR-B20 only) • PayPass™, payWave™ compatible • VISA contactless reader implementation notes • CE approval (compliant to R&TTE directive) • RoHS compliant • WEEE compliant

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7 MTBF statistics

Product	MTBF values
COR-A10	ca. 500.000h

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8 Changelog

Edition overview for this document:				
Edition:	Date:	Issue-, change reason	Creator	release:
01	10.07.2018	Initial Release	M. Fischer	
02				
03				
04				

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