Operating Manual

Designa CONNECT
PAY 500 CASHLESS

Automatic Pay Station for Cashless Payment

Internal technical name (UL): PAY CASHLESS
Series: CONNECT
Version: 1.30 US

Identity no.: DOCUS03080

Original Operating Manual

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1 General

1.1 Information regarding the operating instructions

In this operating manual, instead of the product name PAY 500 CASHLESS, the internal technical designation PAY CASHLESS is used.

The device PAY CASHLESS has been developed for the Designa PARKING MANAGEMENT SOLUTIONS and left our factory after passing stringent safety and reliability criteria. Nevertheless, correct installation and operation are required for safe operation without risk to people and for a long service life.

These operating instructions must therefore be read in its entirety and all safety information and instructions contained therein must be complied with.

These operating instructions are submitted to the Facility Operator and address operator and electrical technicians (skilled and Designa trained electrical technicians) of the system.

- ⇨ Read the operating instructions carefully before starting any work.
- ⇨ Pay careful attention to the safety instructions.
- ⇨ Use the table of contents to find the sections which are important for your daily operating tasks.
- ⇨ Keep the operating instructions for later use, well accessible to the personnel at all times.
- ⇨ When passing the device on to third parties, the operating instructions must also be handed over.

Note on gender equality in language

All personal designations used in this operating manual apply equally to all genders. To improve readability, gender-specific language has been avoided. All references to persons are intended to be understood as gender-neutral.

Digital operating instructions

The original operating instructions are available in digital form. It contains the necessary information for the installation, commissioning, operation, maintenance, servicing and disposal of the device described in these instructions.

The operating instructions can be downloaded via a QR code located inside the device. The operating instructions are also available in the DESIGNA eCademy at https://designa-ecademy.openolat.com/.

All relevant information from the operating instructions must be available to the relevant personnel for each life cycle. The operator is responsible for providing this information.

i – Save the instructions separately and print them out to ensure that they are available in case of data loss.

DESIGNA eCademy

Discover information about courses, further documents, and all the latest news in the DESIGNA eCademy.

After registering you can download the operating instructions and further documents in the electronic read-only media format.

Printed operating instructions

Please contact Designa for the printed operating instructions.

For the address, see invoice, delivery note or imprint.

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1.2 Explanation of signal words and symbols

Safety messages

Following signal words are used to identify the safety messages and property damage messages:

Pay careful attention to the safety messages in order to prevent accidents as well as bodily injuries and property damage.

⚠ DANGER

Indicates a hazardous situation which, if not avoided, will result in death or serious injury.

⚠ WARNING

Indicates a potentially hazardous situation which, if not avoided, could result in death or serious injury.

⚠ CAUTION

Indicates a potentially hazardous situation which, if not avoided, could result in minor or moderate injury.

NOTICE

Indicates a potentially harmful situation which, if not avoided, could lead to property damage.

Hints and recommendations

ℹ … highlights useful hints and recommendations as well as information for an efficient and trouble-free operation.

… highlights valid information for the barcode technology.

Functional symbols and designations

The following symbols and designations are used in the instructions:

–	Instructions specified in warnings
■	List
1.	Step-by-step instructions
⇨	Instructions without fixed sequence
➢	Result of the action
bold	Terms in bold are explained in the glossary
italic	Italic text refers to a component in a figure or a different chapter of these instructions or related instructions.

1.3 Consumables, spare parts and accessories

Designa offers comprehensive consumables, spare parts and accessories for the device PAY CASHLESS.

> These operating instructions mention some consumables. Please refer to your spare parts catalogue and consumables catalogue for further consumables, accessories and spare parts.

1.4 Customer service & service

Your Designa Service is available to you for technical information

For the address, see invoice, delivery note or imprint.

> In order to enable fast handling note the data of the type plate such as device type, order number, identity number, serial number, etc. before calling.

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2 Safety

2.1 Intended use

The device PAY CASHLESS is part of the ABACUS series.

The ABACUS system is an integrated system that controls the entrance/exit, time and cost of parking in protected areas such as parking lots, airports or similar places. The ABACUS automated parking system is designed to give a service (parking) in exchange for money.

All devices of ABACUS are intended for access control in Class II (general commercial), Class III (limited industrial) and Class IV (restricted) vehicular access areas.

The ABACUS devices can be used in conjunction with a computer system (operating computer) UL listed or other series of the ABACUS system that are UL listed or ABACUS low voltage units.

As part of the ABACUS system the PAY CASHLESS serves as an automatic pay station system: It is possible to pay the incurred parking fee, e.g. for a **transient ticket**, exclusively cash-free (debit cards or credit cards or other payment medium valid for the system, e.g. **value checks**).

After paying the parking fee (e.g. for a transient ticket) the customer's ticket is coded with an **exit authorization** and the customer can then leave the parking facility, e.g. at an exit control terminal where the exit authorization is checked.

The device is qualified for either indoor, protected or outdoor locations.

Only original DESIGNA spare parts and consumables should be used.

The DESIGNA system can be equipped with magnetic stripe or barcode technology.

Some functions have limited application for barcode technology (e.g. **types of item**) or are not always capable of functioning **offline**. These limitations are described in more detail in the respective sections.

Barrier-free design

The device has been designed to meet disabled access requirements in publicly accessible buildings (2010 ADA Standards for Accessible Design).

The positioning of controls ensures excellent access and simple operation for wheelchair users and other persons with disabilities and physical limitations.

Please pay attention to country-specific regulations.

The device PAY CASHLESS can be equipped with a hearing induction loop, which enables hearing aid users to hear more clearly in areas of high ambient noise.

2.2 Non-intended use

Non-intended use

⚠ WARNING

Risk of injury from non-intended use!

Every non-intended use can cause severe or lethal injuries.

- Only use the device PAY CASHLESS as intended.
- Read the operating manual carefully and pay careful attention to the safety instructions.

The ABACUS system and thus the PAY CASHLESS are ***not*** intended for Class I (residential area) use and pedestrian access.

The device PAY CASHLESS must not be used in explosive environments.

Use of non-approved spare parts and accessories is prohibited.

Modifications or changes to the device are prohibited.

Use as a storage area is not permitted.

Use of unsuitable media (consumer goods, cleaning agents) is not permitted.

Deployment of non-trained personnel is prohibited.

All uses not described as intended use are prohibited and are non-intended use.

The manufacturer shall refuse to accept liability and withdraw warranty if the instructions are not followed and if the device is used incorrectly or for a purpose for which it was not intended.

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2.3 Safety on site

The operator has to pay attention to the following measures in order to guarantee safety in the parking facility area:

- ⇨ Always keep children away from system devices.
- ⇨ Select easily recognizable warning colors and signs used in the parking facility area.
- ⇨ Provide separate footpaths next to entrances and exits and mark pedestrian areas (see figures below) to ensure that pedestrians do not have to walk near entrances and exits and on the roads.
- ⇨ Make sure that there are sufficient fully visible signs around the parking facility site. Keep signs clean and position them so that they can be read easily.
- ⇨ Use additional safety barriers (e.g. safety cones) to close off entrances and exits when carrying out work there and wear safety clothing in easily recognizable warning colors.
- ⇨ Make sure that the danger area of the devices cannot be accessed by any unauthorized persons, and in particular not by children, under any circumstances.

Fig. 1: Safety marking on the road

If gates are installed in your ABACUS system the operator should pay attention to the following measures:

- ⇨ Provide all footpaths with a sufficient distance to the lanes and the gates. Observe national regulations.
- ⇨ Observe the safety instructions in the gate's operating manual.
- ⇨ Ensure that you dispose of detailed and recent operating manuals for your gates.
- ⇨ Forward any instruction supplied by the listed gate arm manufacturer to the parking operator.
- ⇨ Ensure that the gate's danger zone is clearly marked:
  - using colored markings on the road surface (e.g. pictogram "No pedestrians") and
  - using respective signs *(see figures below)*, in order to stop people entering the danger zone during automatic or manual operation; thus reducing the risk of injuries.
- ⇨ Ensure that permanently mounted controls intended for activation are located at least 6 ft (1.83 m) away from any moving part of the gate.
- ⇨ Ensure that gate and gate arm are installed at least 19.7 in (approx. 500 mm) away from any rigid objects or pedestrian walkway.
- ⇨ Place a sign in visible locations so as to warn pedestrians walking near the gates of the possible risk of entrapment and risk of injury due to gate motion.
- ⇨ Pay particular attention to the safety measures.
- ⇨ Place two signs minimum 8.66 in (approx. 220 mm) by 11 in (approx. 280 mm) with the illustrated safety information in visible location close to the gate.

The signal word **WARNING** and the safety alert symbol (orange **!** in solid black equilateral triangle) shall be centered on an orange background.

Fig. 2: Gate‘s danger zone sign I

⇨ Place two signs min. 3 in (approx. 77 mm) by 11 in (approx. 280 mm) with the illustrated safety information in visible location close to the gate.

Fig. 3: Gate’s danger zone sign II

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2.4 Specialists and operating personnel

⚠ WARNING

Risk of injury in case of inadequate qualification!

Improper handling can lead to considerable bodily injuries and property damage.

- The operator takes the responsibility that only Designa electrical technicians or electrical technicians of Designa trained and authorized dealers and partners carry out installation, connection, commissioning, assembly, adjustments and servicing.
- The operator is allowed to conduct certain maintenance and filling work with an instructed and basic training skilled shift manager. The maintenance work is indicated and described in the chapter *14 Maintenance on page 78* as well as in the maintenance sections of the individual modules.
- All other maintenance work must be conducted by Designa electrical technicians or electrical technicians of Designa trained and authorized dealers and partners.

The operating instructions specifies the following qualification requirements for the different fields of activity:

Shift manager

Shift managers (also called route man) conducting certain maintenance and filling work ***inside*** the device need to be specially instructed and trained on power supply disconnecting features and on the working steps to be carried out in the device interior.

Specialized staff

Specialized staff is due to its technical training, knowledge and experience as well as due to its knowledge of the pertinent regulations able to carry out the work assigned to it and to independently recognize potential hazards.

Electrical technicians

Qualified electricians authorized to carry out work at electrical installations according to national and local regulations and standards.

They are able, due to their technical training, knowledge and experiences as well as knowledge of the relevant standards and regulations, to execute tasks on electrical systems and to independently recognize possible hazards.

Designa electrical technicians or electrical technicians of Designa trained and authorized dealers and partners

Designa electrical technicians or electrical technicians of Designa trained and authorized dealers and partners comply with the requirements of the electrical technicians named here. Additionally, these electrical technicians are trained and authorized by Designa to perform installation, connection and servicing at the device PAY CASHLESS.

2.5 Personal protective equipment

It is necessary to wear personal protective equipment when dealing with the device so as to minimize health hazards.

Before carrying out any work, properly dress in the necessary protective equipment such as work clothes, protective gloves, safety shoes, helmet, etc. and wear them during work.

2.6 Occupational safety and special dangers

The remaining risks resulting from the risk analysis are specified in the following section.

Observe the safety notes listed here and the warning notes mentioned in the other chapters of these instructions to reduce health hazards and to avoid dangerous situations.

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2.6.1 Product safety labels on the device

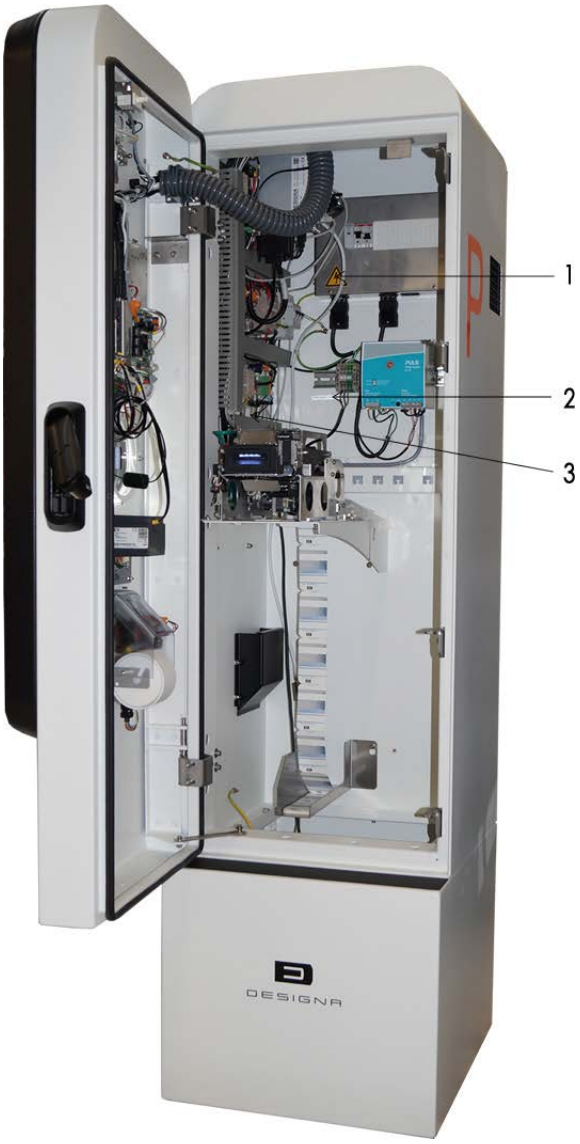

Fig. 4: Product safety labels

1 Safety sign Electric voltage at the power distribution box
2 Labels at the terminal block -X0 (connection and grounding information)
3 Low voltage information at low voltage terminals (e.g. terminal block -X2)

Not shown:

4 Safety sign Hot surface at the optional heater (on the cover)
5 Type plate (on the left side of the housing)
6 Safety sign Laser radiation on the Multicon (only barcode technology)

⇨ Check that all product safety labels are in place and display the information specified below.

⇨ Contact your Designa Service if any labels are missing or damaged.

Low voltage information at low voltage terminals

The following low voltage information must be provided in close proximity to the low voltage terminals (for connections to external devices):

- "Class 2 supply, 24V" [1]

Labels at the terminal block -X0

Connection information at the terminal block -X0

The following connection information must be provided in close proximity to the fused terminal *(see chapter 5.3.5 Terminal block -X0: Voltage connection on page 37)*:

- "Use copper wires only" [2]

Grounding information at the terminal block -X0

The grounding information must be provided in close proximity to the main grounding terminal *(see chapter 5.3.5 Terminal block -X0: Voltage connection on page 37)*:

-

Safety sign Electric voltage at the power distribution box

The following safety sign denotes life threatening situations caused by electric voltage. Non-observance of the safety sign causes severe injuries or death *(see chapter 5.3.4 Power distribution box on page 35)*.

-

Safety sign Hot surface at the optional heater

The following safety sign denotes the presence of a hot surface. Non-observance of the safety sign can lead to minor injuries *(see chapter 5.3.10 Heater and thermostat (optional) on page 40)*.

-

Type plate

See chapter 3 Identification on page 22.

Safety sign Laser radiation on the Multicon (only barcode technology)

Barcode scanner: class 2 laser product. Non-observance of the warning sign may result in eye damage *(see chapter 17.4.4 Check ticket imprint on page 108)*.

-

2.6.2 Safety messages and operation safety

Observe the safety messages listed here to reduce health hazards and to avoid dangerous situations.

[1] Additionally for Canada: « Alimentation 24V Class II »

[2] Additionally for Canada: « Utiliser uniquement des câbles en cuivre »

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Electric voltage

⚠ DANGER

Danger of death due to electric shock!

Contact with live components may result in death.

- Installation, connection, commissioning, assembly, adjustments and servicing have to be carried out by Designa electrical technicians or electrical technicians of Designa trained and authorized dealers and partners.
- Optional accessories mounted on site must be installed by Designa electrical technicians or electrical technicians of Designa trained and authorized dealers and partners.
- Filling, emptying and some maintenance work inside the device may be carried out by DESIGNA trained operating personnel who are familiar with the operating instructions and safety information, called **shift manager** in these instructions. All other maintenance work has to be carried out by Designa electrical technicians or electrical technicians of Designa trained and authorized dealers and partners.
- Cross-section of field wires used for mains line shall comply with requirements of Nation Electric Code (NFPA 70) and any applicable Local Codes as well as with the specifications under *4 Technical Data on page 23*.
- Use permanent wiring per Local Codes for permanently connected devices.
- National and local codes for accident prevention at electrical installations and equipment must always be followed.
  Please consider in particular:
  - Provide an UL listed, suitably rated GFCI (ground fault circuit interrupter) in the branch circuit installation supplying the device.
  - Also provide - e.g. at the fuse box - an UL listed all-pole disconnection main switch for the device PAY CASHLESS which can be locked in the OFF position (prevents accidental reconnection, e.g. when carrying out installation work).
- All branch circuits for hard wired units must be suitable for the unit ratings.
- Replacement of fuses or other components must be done with identical or at least equivalent type and ratings.
- Ensure that the device is always locked correctly in order to avoid endangering third parties.
- It is imperative to observe information about Maintenance Services in order to guarantee safe operation.

Thunderstorm, lightning, electric voltage

⚠ DANGER

Danger of death from lightning and electrical voltage!

If lightning strikes the device, contact to the device components and direct proximity to the device includes mortal danger.

- Never install the device during thunderstorms.
- Protect yourself in buildings or vehicles.

Improper operation

⚠ WARNING

Danger from improper operation of the device!

Improper operation of the device can cause severe or lethal injuries

- Only additions to the device that are permitted by the manufacturer may be installed.

Improper transport

⚠ WARNING

Danger from improper transport of the device!

The weight of the device can severely injure a person.

- Have them transported by specialized staff only.
- Check fasteners (packaging straps) for damage or tears.
- Use lifting gear or forklift with a suitable pallet.
- Use suitable lifting gear (loops, etc.) for lifting the device. The lifting gear must be designed for the respective weights.
- Never attempt to lift the device on your own.
- Always wear safety shoes.

Heavy weight

⚠ WARNING

Risk of injury when lifting heavy objects alone!

The weight of heavy objects can severely injure a person.

- Never attempt to lift the device on your own.
- Always wear safety shoes.

Falling components

⚠ WARNING

Risk of injury from falling components!

Falling components can cause severe injury.

- Secure the device PAY CASHLESS against tilting before assembly.
- Install the device correctly.

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Insufficient fixing

⚠ WARNING

Risk of injury at insufficient fixing!

Insufficient fixing of individual components such and additions permitted by the manufacturer can cause severe injury.

- Only Designa electrical technicians or electrical technicians of Designa trained and authorized dealers and partners are allowed to assemble the device and the appropriate components.
- Check the foundation anchors fit tightly before starting the commissioning.
- Check the firm fixing of all screws according to maintenance schedule.

Illegible signage

⚠ WARNING

Risk of injury by illegible symbols!

Labels and signs can become dirty or unrecognizable in the course of time.

- Always keep safety, warning and operating notes in a well readable condition.
- Immediately renew damaged or unrecognizable signs or labels.

2.7 Safty standard of device

The standards used to evaluate the system were

- for United States Listing (USL) UL 751 and UL 325
- for Canadian certification (CNL) CAN/CSA 22.2 #128 and CAN/CSA-C22.2 No. 247-92

3 Identification

3.1 Type plate

The device type plate is located on the housing.

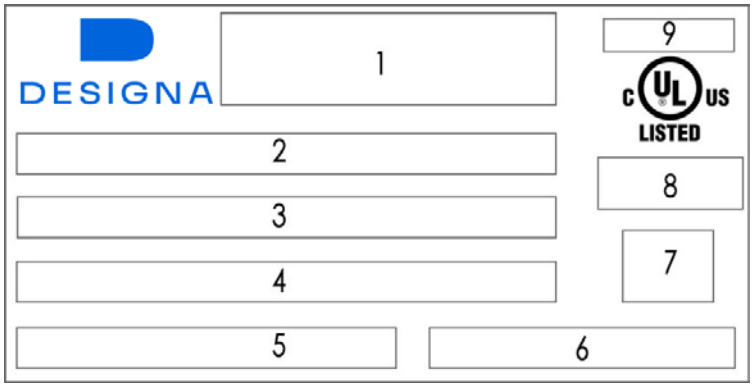

Fig. 5: Type plate

1 Manufacturer's name and address
2 Model
3 Serial no.
4 Input: Power supply and current consumption
5 YOM: Year and month of manufacture
6 Manufacturing country
7 QR Code
8 Description and file number
9 Indoor/ outdoor use

Some modules are also equipped with a type plate. The type plate is then located directly on the module.

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4 Technical Data

Dimensions and weight

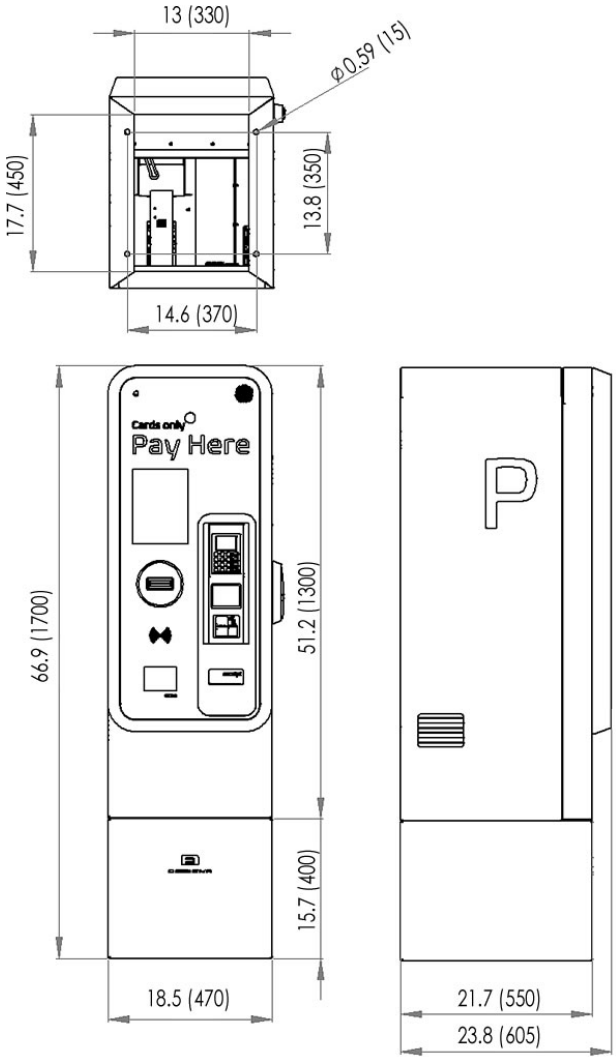

Fig. 6: PAY CASHLESS: approx. dimensions in inch and (mm)

Dimensions: Pedestal	
Standard	15.7 in (400 mm) (barrier-free design according to 2010 ADA Standards for Accessible Design)
Optional	3.94 to 23.6 in (100 to 600 mm)

Description	
Weight	approx. 265 lbs (120 kg) (depending on equipment)

Electrical connection

Description	
Power supply	120 V AC, 60 Hz
Current consumption device	operation 0.38 A max. 2 A
Current consumption heater (optional)	3.4 A
Power consumption device	operation 45 W max. 240 W
Power consumption heater (optional)	400 W
Network system	TN-S System
Pre-fuse	max. 13 A
Max. wire size	AWG 14
Connection type	tension spring connection
Protection class	I
Control voltage	24 V DC

Operating conditions

Description	
Operating temperature	without optional heater: +50 °F to +122 °F (+10 °C to +50 °C) with optional heater: -4 °F to +122 °F (-20 °C to +50 °C) (fan optional)
Storage temperature	-13 °F to +158 °F (-25 °C to +70 °C)
Relative humidity	max. 95 %, non-condensing
Noise development	< 70 dB(A)
Ingress protection rating:	IP 54
Laser class barcode scanner (Multicon)	Class 2

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5 Device Description

Below there is an overview of the design and functions of a standard device. Some components which can be perceived as units are described as independent modules at the end of these operating instructions.

5.1 General design

1 Housing
2 Door
3 Illuminated frame
4 Front panel
5 Cover
6 Pedestal

Fig. 7: General design (figure with options)

Design

- Housing, door and pedestal are made of stainless steel 1.4301 (V2A), outer and inner surface with durable, weather resistant powder coating
- Illuminated frame is made of aluminum, weather resistant powder coated
- Front panel is made of Plexiglas® PMMA
- Cover is made of aluminum, weather resistant powder coated

Color

- Housing, door and pedestal: RAL 7012 (basalt gray)
- Illuminated frame and cover: RAL 9017 (traffic black)

5.2 Components on the door and their functions

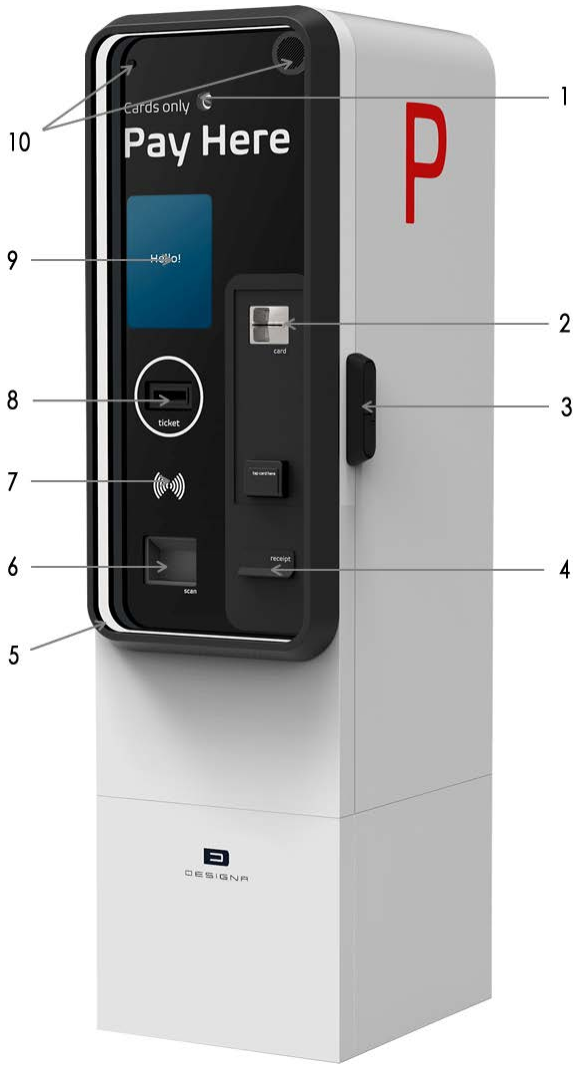

Fig. 8: Components on the door (figure with options)

1 Camera (optional)
2 CC reader/ PINPad terminal/NFC (optional)
3 Locking system
4 Receipt printer
5 Illuminated frame (optional)
6 2D barcode scanner (optional)
7 RFID (hands-free identification) (optional)
8 Insertion slot reading device
9 Full touch display
10 Intercom device

Not shown:

11 Door switch
12 Door fixture
13 Hearing induction loop (optional)

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5.2.1 Camera (optional)

A camera can be installed at the device PAY CASHLESS to ensure network-based video surveillance.

Please contact your DESIGNA Service for further details.

5.2.2 Credit card reader/PINPad/NFC (optional)

The PAY CASHLESS can be equipped with country-specific credit card reader, PINPad terminal and NFC for credit card and debit card processing. Some countries require certified card reading devices and PIN systems for standardized credit card processing.

Function and processing depend on the model in use. Please ask your DESIGNA service for availability and more details.

5.2.3 Locking system

The door is locked and secured in place using a four-point locking rod. This locking rod is secured with a turning lever. And a further cylinder lock secures the turning lever.

Fig. 9: Opening the locking mechanism

1 Cover
2 Cylinder lock
3 Spring loaded handle

Opening the locking mechanism

1. Lift up the *cover*.
2. Turn the key in the *cylinder lock* ***clockwise*** (to the right).

➤ The *spring loaded handle* springs open.

3. Twist the *spring loaded handle* ***anti-clockwise*** (to the left).

Closing the locking mechanism

1. Twist the *spring loaded handle* ***clockwise*** (to the right).
2. Push the *spring loaded handle* back to the original closed position.
3. Turn the key in the *cylinder lock* ***anti-clockwise*** (to the left).

5.2.4 Receipt printer

In order to provide customers with a receipt of the payment process a receipt printer is inserted in the PAY CASHLESS.

For further details see chapter 19 Module Receipt Printer on page 122.

5.2.5 Illuminated frame (optional)

The illuminated frame is illuminated by LEDs. The intensity and color of the illumination can be set by DESIGNA service.

5.2.6 2D Barcode scanner (optional)

A *2D Barcode Scanner* can be installed at the device PAY CASHLESS in order to process barcode ID media for optional prebookings, for the optional discount processing or for the optional processing of the barcode printed on a receipt.

For further details see chapter 12 Operation on page 64.

5.2.7 RFID (optional)

Procedures using hands-free **RFID** cards can only be carried out if a respective antenna has been fitted to the device.

Various hands-free systems/antennas are available in the ABACUS system.

For further details see chapter 20 RFID (Hands-free Identification) (optional) on page 129.

5.2.8 Reading device insertion slot

The *reading device insertion slot* is accessible via the opening in the front panel:

Customers' **transient tickets** or other **types of item** (**monthly cards**, **value cards**) or optional debit cards and credit cards[3] are inserted here for processing. (The option of paying with a credit card is related to the corresponding hard and software equipment).

5.2.9 Full-touch display

The DESIGNA full-touch display offers all standard functions for ticket processing at the entry, pay station and exit as well as the corresponding functionalities for ticketless payment via license plate recognition. The processes are guided by graphical operating instructions.

According to the licenses and requirements for the parking system, the touch display is configured for the respective parking solution and device type.

The full-touch display (10.1") at the device PAY CASHLESS offers the following functionalities:

Language

⇨ Tap the symbol with the globe to switch the display texts to another language.

➤ Each tap switches to the next language set up in the system.

[3] Only for barcode technology when the **Multicon** is equipped with respective hybrid technology and has additional magnetic reading heads (see chapter Module Multicon).

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Help

⇨ Tap the icon with the telephone to speak directly to the operating personnel via the intercom.

Lost Ticket

⇨ Tap the icon with the ticket in case of ticket loss.

➤ The price in the amount of the daily rate is displayed. After payment, the ticket can be used for exit.

Receipt

⇨ Tap the receipt icon to print a receipt as a payment confirmation after payment has been made.

Cancel

⇨ Tap the symbol with the cross to cancel the execution of a function.

Keyboard

The keyboard layout is QWERTY/QWERTZ.

⇨ Tap the globe symbol on the keyboard to switch between the German and English (USA) keyboard layouts (QWERTZ/QWERTY).

⇨ Tap the umlaut function to select language-dependent special characters.

For further information on the functionality and operation of the touch display, please refer to section 12 Operation on page 64 and the separate operating instructions for the touch display.

5.2.10 Intercom device

By pressing the *info button* it is possible to contact the central switchboard for intercommunication and establish speech contact. The customer can receive the necessary assistance via the *intercom device*.

Depending on the type of connection, a differentiation is made between the integrated VoIP intercom device *DESIGNA VoIP*, which does not require a separate connection during installation, and the intercom devices of other manufacturers, which are connected to *terminal block -X2* or an additional Ethernet connection:

DESIGNA VoIP (Voice over IP)

The intercom device *DESIGNA VoIP* is connected *to the central switchboard for intercommunication via* **TCC** and **Ethernet**.
A duplex speech connection is enabled.

Intercom devices of other manufacturers

The intercom devices of other manufacturers require a connection via a 2 or 4-wire intercom circuit or via an additional Ethernet connection. Depending on the equipment, a simplex or duplex speech connection is enabled.[4] Optionally, a function can be triggered at the device from the central switchboard for intercommunication (default: Barrier gate open).

> **i** Various intercom devices are available:
> Please refer to the spare parts catalogue (CD-ROM) to identify the intercom device installed in your device.

Equipment examples

Type	Speech connection	Connection	Function triggering
Bouyer[5]	Simplex	2-wire at terminal block –X2	-
Rocom	Duplex	2-wire at terminal block –X2 + potential-free contact (function triggering)	+
Schneider ET 570	Duplex	4-wire at terminal block –X2	-
Schneider ET 870	Duplex	2-wire at terminal block –X2 + potential-free contact (function triggering)	+
Schneider ET 808	Duplex	2-wire at terminal block –X2 + potential-free contact (function triggering)	+
Schneider ET 908	Duplex	Additional Ethernet connection + potential-free contact (function triggering)	+

5.2.11 Door switch

The *door switch* checks the position of the door. If the door is opened, the door switch sends a signal to the **TCC/SBC** which subsequently sends a corresponding **alarm message** to the **System server**.

The door switch is extracted in order to carry out service and maintenance work and to put the device into “normal mode“ even if the door is open: This simulates a closed door and the device functions can be tested.

5.2.12 Door fixture

The *door fixture* is used to hold the door open securely.

5.2.13 Hearing induction loop (optional)

[4] Simplex speech connection: The installed *loudspeaker is equipped with and integrated microphone*. This provides an alternate one-way system, i.e. if the central switchboard for intercommunication is speaking the customer can only listen and vice-versa.
Duplex speech connection: In addition to the *loudspeaker* a separate microphone and a controller are installed: A two-way intercom connection (simultaneous listening and speaking) is possible

[5] Not available at BlueEdition devices.

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Fig. 10: Example of pictogram for hearing induction loops

A hearing induction loop can be connected to the intercom system of the device. The hearing induction loop enables hearing aid users to hear more clearly in areas of high ambient noise.

⇨ Affix a hearing induction loop pictogram to the device to indicate this hearing assistance system to hearing aid wearers.

5.3 Components inside the device and their functions

Electric voltage

⚠ DANGER

Danger of death due to electric shock!

After switching off the automatic circuit breaker ***only*** the respective connected component is de-energized.

Contact with live components may result in death.

- Flick ***all*** of the automatic circuit breaker switches downwards when working on the inside of the device.
- Pay particular attention to instructions about the automatic circuit breakers, which interrupt the power supply.

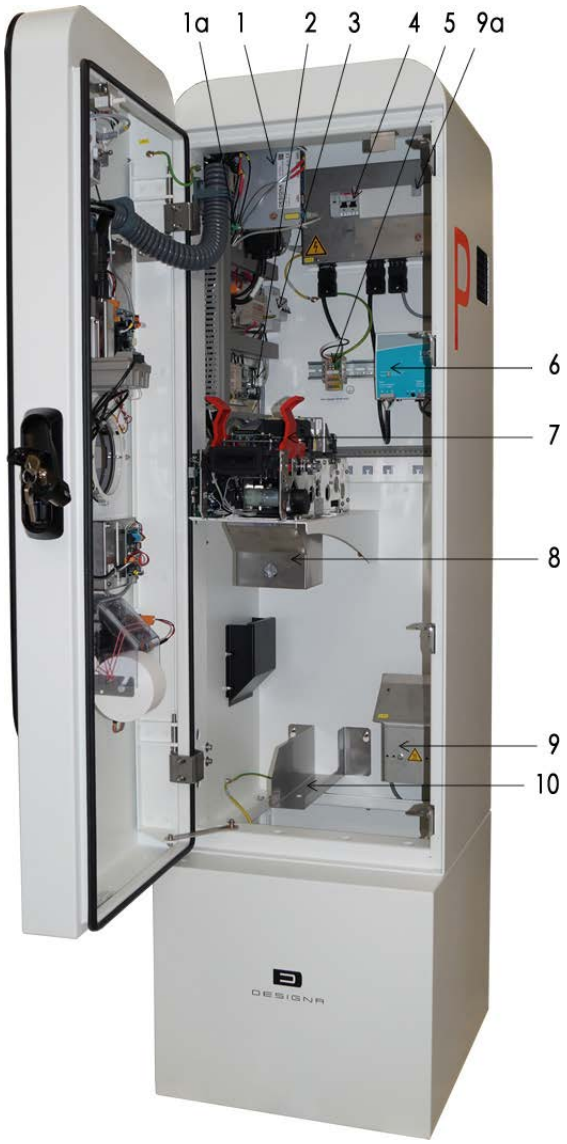

Fig. 11: Components inside the device (figure with options)

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1 TCC (type LCC)
1a) Interface extension USB-4-COM
2 Terminal block -X2: Intercom system and Ethernet connection
3 Terminal block -X3: 3A automatic circuit breakers (secondary side)
4 Power distribution box
5 Terminal block -X0: Voltage connection
6 Power supply unit
7 Multicon
8 Collecting box value checks (optional)
9 Heater (optional)
9a) thermostat (optional)
10 Ticket storage receptacle lost ticket (optional)

Not shown:

11 Fan and thermostat (optional)
12 I/O Interface (optional)
13 Alarm siren (optional)
14 Network components (optional, e.g. DSL modem, Switch and/or other)

5.3.1 TCC (Type LCC)

The **TCC** (Terminal Control Computer) is the central control unit for devices in the ABACUS system and controls all of the actions.

The TCC of type LCC is used.

For further details see chapter 15 Module TCC (Type LCC) on page 90.

5.3.2 Terminal block -X2: Intercom system and Ethernet connection

Connection has to be carried out by Designa electrical technicians or by electrical technicians of by Designa trained and authorized dealers and partners.
Please refer to the chapter 8.4 Connection intercom device (terminal block -X2 or VoIP) on page 56 and 8.3 Ethernet Connection (terminal block -X2 or additional mounting rail) on page 54.

1 Internal connector for Ethernet connection (scope of delivery)
2 Connection intercom system

Fig. 12: Terminal block -X2 (similar to figure)

Connection intercom device (optional)

If the intercom device requires a 2 or 4-wire connection, the cable *of the intercom circuit* is connected to terminal block -X2.

Internal connector for Ethernet connection

Fig. 13: Ethernet connection

The *internal connector for Ethernet connection* is connected to the additionally delivered *Ethernet connection*, after this has been wired on-site with the existent **Ethernet (LAN)** and mounted to the mounting rail of the terminal block -X2 or to an additional mounting rail.

More than one *Ethernet connection* can be necessary depending on the device equipment.

Ethernet surge arrester (optional)

Fig. 14: Option surge arrester for the Ethernet

A *surge arrester for the Ethernet* can optionally be used at the internal wiring between the *Ethernet connection* and the *Ethernet interface* of the **TCC/SBC**. This protects the module TCC/SBC against overvoltage.

5.3.3 Terminal block -X3: 3A automatic circuit breakers (secondary side)

Electric voltage

⚠ DANGER

Danger of death due to electric shock!

The 3A automatic circuit breakers F10, F11 and F12 on the secondary side only protect the 24V components downstream. Therefore, they are **not** suitable for switching off the device when carrying out work inside the device.

Contact with live components may result in death.

– Always use the automatic circuit breakers (6A) for main power voltage F1, F2, F3 in the Power distribution box to switch off the device when carrying out work inside the device *(see chapter 5.3.4 Power distribution box on page 35)*.

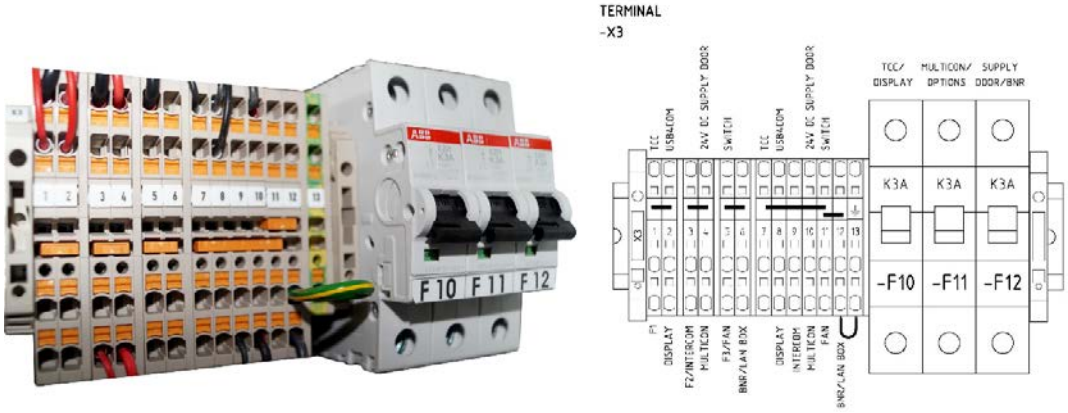

Fig. 15: Terminal block -X3: 3A automatic circuit breakers (secondary side)

Additional fuse protection of the control voltage (24V) takes place via three *3A automatic circuit breakers* (F10, F11 and F12) on the secondary side.

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These split up the control voltage for the components downstream. The three 3A automatic circuit breakers are installed at the *terminal block -X3*.

(see chapter 5.3.4 Power distribution box on page 35)

5.3.4 Power distribution box

Electric voltage

⚠ DANGER

Danger of death due to electric shock!

The power distribution box and the terminal block -X0 are supplied with main power voltage (120 V).

Contact with live components may result in death.

- Only specially instructed **shift managers** are permitted to operate the automatic circuit breaker switches and the optional ON/OFF switch in the power distribution box.
- All other tasks at the power distribution box and the terminal block -X0 have to be carried out by Designa electrical technicians or electrical technicians of Designa trained and authorized dealers and partners.
- After switching off the automatic circuit breaker (position OFF) ***only*** the respective connected component is de-energized. Flick ***all*** of the automatic circuit breaker switches downwards (position OFF) when working on the inside of the device.
- Be aware that the power distribution box and the terminal block -X0 remain energized even when the automatic circuit breakers are switched off. Prior to carrying out work on the power distribution box or the terminal block -X0, switch off the device ***externally*** and secure against reconnection.

Power distribution box

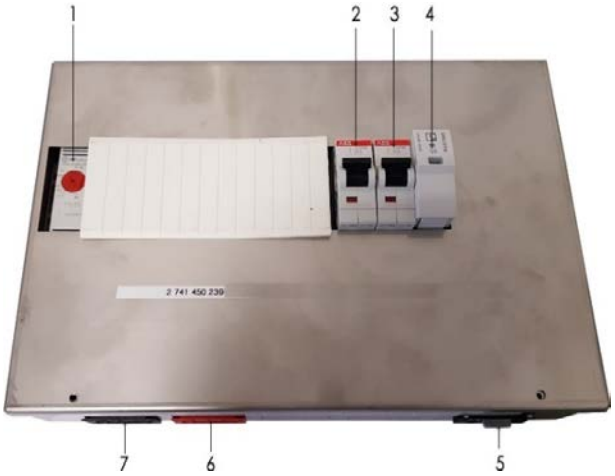

Fig. 16: Power distribution box ((figure with options))

1 Thermostat (optional)
2 Automatic circuit breaker power supply unit (F1)
3 Automatic circuit breaker heater (F2)
4 Surge arrester
5 Power supply panel connector (X1)

6 Socket heater (X11)
7 Socket power supply unit (X10)
Not shown:
8 Power filter

Surge arrester

A *surge arrester* is used at the device PAY CASHLESS to protect the device against voltage spikes.

Fig. 17: Surge arrester

Automatic circuit breaker

Fuse protection of the applied device voltage takes place via 6A automatic circuit breakers. These protect individual components separately allowing the components to be switched on or off individually or, e.g., preventing that a short circuiting of the heater interrupts the electronics.

If a short circuit occurs the automatic circuit breakers interrupt the power supply to the components downstream.

Automatic circuit breaker power supply unit **(F1)**

- Power supply unit

The control voltage (24V) converted by the power supply unit is additionally fused by three 3A automatic circuit breakers on the secondary side *(see chapter 5.3.3 Terminal block -X3: 3A automatic circuit breakers (secondary side) on page 34)*.

Automatic circuit breaker heater **(F2)**

- Heater and thermostat (optional)

Position OFF/ON

1 Position OFF (downwards)
2 Position ON (upwards)

Fig. 18: Automatic circuit breaker, position OFF and ON

Switch off automatic circuit breaker

⇨ Flick the switch of the automatic circuit breaker down (position OFF, ❶) to switch ***off*** the respective component.

Switch on automatic circuit breaker

⇨ Flick the switch of the automatic circuit breaker up (position ON, ❷) to switch ***on*** the respective component.

Power supply panel connector

The mains wiring is pre-wired from the terminal block -X0 to the *power supply panel connector (X1)* via a 3-pole jack.

Sockets for power supply unit and heater

The *power supply unit* and optional *heater* are connected via 3-pin sockets at the power distribution box. The sockets for the *power supply unit (X10)* and the *heater (X11)* are available at the power distribution box.

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Mains filter

The *mains filter* is filtering out interfering frequencies of the mains current.

5.3.5 Terminal block -X0: Voltage connection

Electric voltage

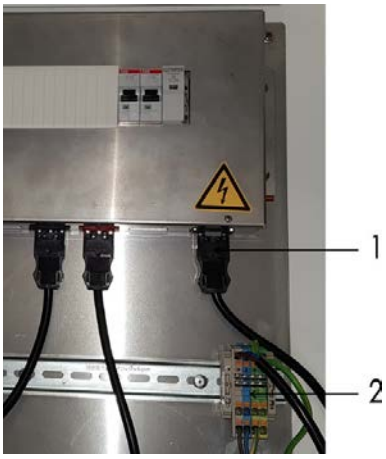
⚠ DANGER

Danger of death due to electric shock!

The terminal block -X0 is supplied with main power voltage (120 V).

Contact with live components may result in death.

- Electrical connection has to be made by Designa electrical technicians or electrical technicians of Designa trained and authorized dealers and partners.
- Switch off the device ***externally*** and make sure that it cannot be switched on again before carrying out work on the terminal block -X0.
- *Please refer to the chapter 8.2 Power supply connection (terminal block -X0) on page 52.*



1 Power supply panel connector (X1) at the power distribution box
2 Power supply terminal (-X0)

Fig. 19: Terminal block -X0

The mains wiring at the place of installation is connected to the *power supply terminal* at terminal block -X0.

5.3.6 Power supply unit

Electric voltage

⚠ DANGER

Danger of death due to electric shock!

The power supply unit is supplied with main power voltage (120 V).

Contact with live components may result in death.

- Any servicing on the power supply unit has to be made by Designa electrical technicians or electrical technicians of Designa trained and authorized dealers and partners.
- Before carrying out work on the power supply unit make sure it is switched off *(see chapter 5.3.4 Power distribution box on page 35)*.
- Test for absence of voltage.

Fig. 20: Power supply unit (similar to figure)

The *power supply unit* supplies electric power to the device components. The alternating input voltage is converted to 24V direct voltage. Correct operation of the power supply unit is displayed via a LED ❶, which emits a green light during normal operation.

The power supply unit requires to be fused on the secondary side with three additional 3A automatic circuit breakers *(see chapter 5.3.3 Terminal block -X3: 3A automatic circuit breakers (secondary side) on page 34)*.

5.3.7 Multicon

The (read-)write device is called the *Multicon*.

For further details see chapter 17.4.4 Check ticket imprint on page 108 and 18 Multicon MC Barcode Module on page 114.

5.3.8 Collecting box value checks (optional)

Fig. 21: Collecting box value checks

It is optionally possible to use **value** or **time checks** as payment medium. These are tickets from the ABACUS system to which a specified money or time value is assigned. They are used as a payment medium at the PAY CASHLESS and are withdrawn after processing.

For this, there is a *collecting box value checks* available underneath the **Multicon**.

For detailed function specification: *See Paying with value/time checks (optional) on page 66 and also the separate operator manual WinOperate*.

5.3.9 Ticket storage receptacle lost ticket (optional)

A **lost ticket** can be issued to customers who claim to have lost their ticket.

For this, the PAY CASHLESS has to be equipped with a respective **Multicon** and a *ticket storage receptacle*.

For further details see chapter 12.10 Issue of lost tickets (optional) on page 74 and also the separate operator manual WinOperate.

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5.3.10 Heater and thermostat (optional)

Electric voltage

⚠ DANGER

Danger of death due to electric shock!

The heater and thermostat are supplied with main power voltage (120 V).

Contact with live components may result in death.

- Only specially instructed **shift managers** are permitted to adjust the temperature at the thermostat.
- All other tasks at the heater and thermostat have to be carried out by Designa electrical technicians or electrical technicians of Designa trained and authorized dealers and partners.
- Before carrying out work on the heater and thermostat make sure they are switched off *(see chapter 5.3.4 Power distribution box on page 35)*.
- Test for absence of voltage.

Hot surface

⚠ CAUTION

Danger of burns!

The surface of the heater may become hot during operation.

Contact with the heater may result in burns.

- Do not touch the surface of the heater.
- Always ensure that the heater has cooled down sufficiently before carrying out tasks in the vicinity of the heater.

Fig. 22: Heater (1) and thermostat (2) (similar to figure)

The heater protects the device against low temperatures, prevents the formation of condensation water and allows operation at ambient temperatures of -4°F (-20°C).

The temperature inside the device is kept at the temperature set on the *thermostat*. The switching threshold, which causes the *heater* to be switched on, is infinitely set via a regulator (red control scale).

ℹ The thermostat is not pre-set on delivery. The desired temperature has to be set before commissioning. Recommended temp.: 68°F (20°C)

5.3.11 Fan and thermostat (optional)

Fig. 23: Fan and thermostat (similar to figure)

The device can be equipped with an optional efficient *fan* ❶.

The switching threshold, which causes the fan to be switched on, is infinitely set via a regulator (blue control scale) on the *thermostat* ❷.

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5.3.12 I/O interface (optional)

Optionally, the module *I/O interface* ”Midi-P-USI“ (12 I/O = 12 Inputs/ 12 Outputs) is used at the PAY CASHLESS.

For further details see chapter 16 Module I/O Interface Midi-P-USI (12 I/O) (optional) on page 96.

5.3.13 Alarm siren (optional)

Loud noises

⚠ CAUTION

Risk of injury due to loud noises!

An alarm signal (approx. 110 dB) is activated if the housing door is opened without previously using an authorizing function card.

– Always use the authorizing function card before opening the housing door.

Fig. 24: Alarm siren

If the optional *alarm siren* is installed, an alarm signal sounds if the PAY CASHLESS door is opened without using the appropriate function card (depends on **device configuration**).

5.3.14 Network components (optional)

Customer specific network components, such as e.g. DSL modem, switch etc., can be installed. For example, an optional DSL modem can be used in the PAY CASHLESS, if the **LAN** is a two-core cable network. Please refer to the manual which is delivered separately with the DSL modem or ask your DESIGNA service for more details.

6 Transport and Storage

6.1 Safety

Improper transport

⚠ WARNING

Danger from improper transport of the device!

The weight of the device can severely injure a person.

- Have them transported by specialized staff only.
- Check fasteners (packaging straps) for damage or tears.
- Use lifting gear or forklift with a suitable pallet.
- Use suitable lifting gear (loops, etc.) for lifting the device. The lifting gear must be designed for the respective weights.
- Never attempt to lift the device on your own.
- Always wear safety shoes.

Improper transport

NOTICE

The device can be damaged by improper transport.

Substantial material damages can result from improper transport.

- Have them transported by specialists only.
- When unloading the packages and during in-plant transportation always proceed with greatest care and caution.
- Observe the symbols on the packaging.
- Observe the dimensions of the device.
- Loading, unloading as well as moving the device must take place with greatest care.
- Only remove packaging directly before assembly.

Personal protective equipment

The following must be worn during all work:

- Work clothes
- Protective gloves
- Safety shoes

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6.2 Transport inspection

1. Check the delivery immediately after receipt for completeness and transport damage.
2. If there is any externally visible transport damage, proceed as follows:
   - ⇨ Do not accept the delivery or accept it only under reserve.
   - ⇨ Note the extent of damage on the transport documents or on the delivery note of the forwarder.
   - ⇨ Lodge complaint.

> **i** Lodge a complaint for each defect, as soon as it is recognized. Compensation claims can only be submitted within the valid complaint periods.

6.3 Transport

The lifting gear must be designed for the weight of the device.

For transport the device refer to the safety notes.

For future transports

1. Secure loose cables.
2. Secure the device against vibrations.
3. Securely fasten the device prior to transport (e.g. screw it onto a pallet).
4. Transport and put down the device with a forklift and lift with suitable lifting gear.

6.4 Storage

Store the device or packages under the following conditions:

- Do not store outdoors.
- Store dry and protected from dust.
- Do not expose to aggressive media.
- Protect against sun damage.
- Avoid mechanical vibrations.
- Storage temperature: -13 °F to +158 °F (-25 to +70 °C)
- Relative humidity: max. 95 %, non-condensing
- Check the general condition of all components and packaging regularly, if they are stored for periods longer than 3 months.

7 Installation

7.1 Safety

Electric voltage

⚠ DANGER

Danger of death due to electric shock!

Contact with live components may result in death.

- Installation has to be carried out by Designa electrical technicians or electrical technicians of Designa trained and authorized dealers and partners.
- Make sure that the power supply is ***externally*** disconnected and that it cannot be switched on.
- Test for absence of voltage.

Inappropriate installation

⚠ WARNING

Risk due to inappropriate installation!

Inappropriate installation may cause serious injuries.

- Installation has to be carried out by Designa electrical technicians or electrical technicians of Designa trained and authorized dealers and partners.
- Prior to work, ensure that there is sufficient assembly space.
- Pay attention to tidiness and cleanness at the assembly site! Loosely stacked or lying around components and tools are accident sources.
- Comply with specifications for foundations and reinforcement.
- Ensure correct arrangement and fit on all assemblies and components.
- Install the indicated fastening elements correctly.

Heavy weight

⚠ WARNING

Risk of injury when lifting heavy objects alone!

The weight of heavy objects can severely injure a person.

- Never attempt to lift the device on your own.
- Always wear safety shoes.

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Inappropriate cleaning with air pistols

⚠ CAUTION

Risk of injury due to inappropriate cleaning with air pistols!

Inappropriate cleaning with air pistols may result in minor injuries or damage to eyes due to flying particles.

- Always wear safety goggles.
- Prevent air penetrating the body through skin injuries.
- Do not aim air pistols at people.
- Only use air pistols with a maximum pressure of 50.8 psi (3.5 bar).
- Only use air pistols with a reduced noise level (multi-hole nozzles).

NOTICE

Dirt, dust and construction implements can endanger the sensitive electronics and mechanism of the device and impair safe operation.

- The shell of the parking lot building should be completed before installing devices.

Personal protective equipment

The following must be worn during all work:

- Work clothes
- Protective gloves
- Safety shoes

NOTICE

Operation of this device in a residential area may cause radio interference.

7.2 Installation preparation

Location requirements

The device is qualified for either indoor, protected or outdoor locations.

⇨ Please see the chapter *4 Technical Data on page 23* for the area required for installation.

⇨ Choose a location which offers enough additional operating space (for opening the door etc.).

⇨ Make sure that there are sufficient, fully visible signs around the parking facility site. Keep signs clean and position them so that they can be read easily.

⇨ Use signs to clearly display areas (e.g. entrance and exit).

⇨ Provide separate footpaths next to entrances and exits and mark pedestrian areas, to ensure that pedestrians do not have to walk near entrances and exits or on the roads.

⇨ It is essential to observe the safety information in the barrier gate's operating instructions and the following notes if barrier gates are installed in your system.

- Install gate and gate arm at least 2 ft (610 mm) away from any rigid objects or pedestrian walkway.
- Place a placard in visible locations so as to warn pedestrians walking near the gates of the possible risk of entrapment and risk of injury due to barrier gate motion.
- Pay particular attention to the safety information in the gate's operating instructions and in the main Safety chapter of these instructions if gates are installed in your ABACUS system.

Foundation requirements

The device has to be installed on a concrete foundation.

> **i** The concrete foundation must be sufficiently rigid as to withstand the weight of the unit fully loaded: it needs to have a strength of 3600 psi (25 N/mm²).
> The foundation needs to have a frost-depth of approx. 2.6 feet (approx. 800 mm) and must be non-flammable!
> The foundation has to have a smooth concrete finish.

1. Pour the foundation according to manufacturer specifications.
2. Lead the ductworks into the middle of the foundation from the foundation cast. Ensure that the cables are led through the middle of the pedestal opening.
3. Leave at least approx. 8 ft (approx. 2.50 m) of the supply cables for a simple connection.
4. Embed (if available) the DESIGNA foundation frame into the concrete during the building stage and level the foundation frame with a spirit level.
5. Provide the foundation with a smooth concrete finishing.
   If a foundation frame is embedded, make sure its surface is flush with the smooth concrete finishing after embedding.
6. Ensure that the surface is a non-flammable surface and sufficiently rigid as to withstand the weight of the unit fully loaded (3600 psi (25 N/mm²)) and that in outdoor locations a frost-depth of approx. 2.6 ft (approx. 800 mm) is ensured.

   > **i** For further information regarding the required condition of the device foundation at the installation location refer as well to the documentation of the supplied anchoring and fastening material.

7. Ensure that the poured foundation material has completely hardened before installing the device onto the *foundation frame* or before preparing the mounting with the *DESIGNA mounting kit*.

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7.3 Different mounting possibilities

Mounting possibilities

The following device mounting possibilities are available:

- with the DESIGNA mounting kit

7.3.1 Preparation with the mounting kit

The devices are fastened with the Designa mounting kit, if no Designa foundation frame is provided (e.g. not embedded into the concrete during construction or not available for the device).

The following is required for mounting:

Designa mounting kit

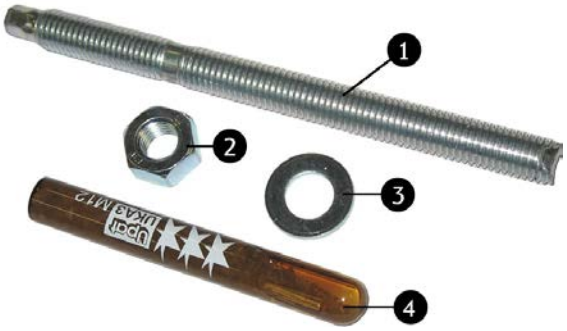

Fig. 25: Designa mounting kit

1 Galvanized threaded rod (M12x160) (4x)
2 Stainless steel hexagon nuts (M12; ISO 4032, DIN 934) (4x)
3 Stainless steel washers (A13; DIN 125) (4x)
4 Mortar cartridge (M12) (4x)

Not shown:

5 If included in the scope of delivery: 2x mounting bars)

Skin and eye irritation

⚠ CAUTION

Skin and eye irritation from improper application of the mortar cartridges!

Improper application of the mortar cartridges may cause skin and eye irritations.

- Use the mortar cartridges only if undamaged.
- Avoid eye and skin contact.
- See also the manufacturers' instructions for the mortar cartridges.

Setting the anchor bolts

Prerequisite: The concrete foundation must be fully cured.

1. Check completeness and quality of the fastenings.
2. Use the drilling pattern of the foundation frame to mark the bore holes or position the device and mark the holes using the bore holes in the housing base.
3. Drill holes in the concrete foundation with a diameter of 0.55 in (14 mm) and a depth of 4.33 in (110 mm).
4. Clean the holes with compressed air.
5. Fully insert the mortar cartridges into the clean holes.

6. Use a hammer drill or percussion drill to insert the threaded rods into the bore hole and mortar cartridges. Please pay careful attention to the mortar cartridges instructions.
7. Observe the hardening times mentioned below:

Typical hardening times

Hole temperature		Waiting time valid for dry material	Waiting time valid for wet material
°C	°F		
> 20 °C	> 68 °F	20 min	40 min
10 - 20 °C	50...68 °F	30 min	1 h
0 - 10 °C	32...50 °F	1 h	2 h
–5 - 0 °C	23...32 °F	5 h	10 h

8. Have the mounting accessories ready for final mounting.

7.4 Unpacking the device

The individual packages have been packed according to the expected transport conditions.

The packaging must protect the individual components against transport damage, corrosion, etc. prior to assembly. Therefore, do not damage the packaging and only remove it immediately before assembly work.

1. Transport the device to its place of installation and then unpack it.
2. Loosen the screwed connections with which the device is mounted to its transport aid (e.g. wooden pallet).
3. Have the mounting profiles ready for final mounting.
4. Separate the packaging according to type and size, and either reuse it or recycle it.

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7.5 Installing the device

Electric voltage

⚠ DANGER

Danger of death due to electric shock!

Contact with live components may result in death.

- Installation has to be carried out by Designa electrical technicians or electrical technicians of Designa trained and authorized dealers and partners.
- Make sure that the power supply is ***externally*** disconnected and that it cannot be switched on.
- Test for absence of voltage.

DESIGNA mounting kit

1. Lift the device with the bore holes in the housing base onto the anchor bolts.
2. Hold the device in a position that the cable can be fed through the opening in the base and into the housing.
3. Use mounting profiles, hexagon screws/ nuts and washers to attach the device to the anchor bolts. At first, only hand-tighten the hexagon nuts/ screws.
4. Align the device with a spirit level (clearance is guaranteed due to the clamp fixture). Ensure that the housing is not buckled due to unevenness of the floor.
5. Now tighten the hexagon nuts (33 ft lb (45 N m)).
6. Check that the device is fixed and standing securely.
7. Remove the transport safety devices of the device components, if available.
8. Seal the gap between the device and foundation with silicone.
9. Check the alignment of the assemblies with respect to the input and output slots of the door and, if necessary, adjust *(see chapter 17.4.7 Checking the correct position of the Multicon insertion slot on page 110)*. The slots must be flush with or slightly protrude from the front plate (approx. 0.04 in (1 mm)).

8 Connection

8.1 Safety

Electric voltage

⚠ DANGER

Danger of death due to electric shock!

Contact with live components may result in death.

- Connection has to be carried out by Designa electrical technicians or electrical technicians of Designa trained and authorized dealers and partners.
- Cross-section of field wires used for mains line shall comply with requirements of Nation Electric Code (NFPA 70) and any applicable Local Codes as well as with the specifications under Technical data.
- Use permanent wiring per Local Codes for permanently connected devices.
- National and local codes for accident prevention at electrical installations and equipment must always be followed. Please consider in particular:
  - Provide an UL listed, suitably rated GFCI (ground fault circuit interrupter) in the branch circuit installation supplying the device.
  - Also provide - e.g. at the fuse box - an UL listed all-pole disconnection main switch for the device which can be locked in the OFF position (prevents accidental reconnection, e.g. when carrying out installation work).
- Always ensure proper grounding: An appropriate grounding is essential to avoid shock hazards and to ensure a proper and safe operation of the device.
- Always ensure that the line voltage field wiring is sufficiently routed away from the low voltage secondary circuit (min. 3.94 in (100 mm)): Line voltage field wiring shall be reliably routed away from low voltage field wiring unless the low voltage wires are rated for line voltage.
- Do not damage the insulation of the individual wires when stripping the mains wiring.
- Cables supplied with the device for connection of a Class 2 circuit to an external device and cables supplied with an external device intended for connection to a Class 2 circuit of the device shall comply with the Standard for Power-Limited Circuit Cables. Use cable type CL2, CL2P, CL2R or CL2X or other cable with equivalent or better electrical, mechanical, and flammability rating.

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Inappropriate connection

⚠ WARNING

Danger by inappropriate connection!

Inappropriate connection can cause severe or lethal injuries.

- Connection has to be carried out by Designa electrical technicians or electrical technicians of Designa trained and authorized dealers and partners.
- Pay attention to tidiness and cleanness at the assembly site. Loosely stacked or lying around components and tools are accident sources.
- Tighten all screws correctly.

Hot surface

⚠ CAUTION

Danger of burns!

The surface of the heater may become hot during operation.

Contact with the heater may result in burns.

- Do not touch the surface of the heater.
- Always ensure that the heater has cooled down sufficiently before carrying out tasks in the vicinity of the heater.

Personal protective equipment

The following must be worn during all work:

- Work clothes
- Protective gloves
- Safety shoes

8.2 Power supply connection (terminal block -X0)

Electric voltage

⚠ DANGER

Danger of death due to electric shock!

If the mains wiring is not connected to the terminal clamps correctly, loosens from the connection clamps and touches the housing or door, there is a direct danger to life from electric shock.

- Connection has to be carried out by Designa electrical technicians or electrical technicians of Designa trained and authorized dealers and partners.
- Check that the cross-section of field wires used for mains line and electrical safety measures comply with requirements of Nation Electric Code (NFPA 70) and any applicable Local Codes and make sure they correspond with the specifications under *4 Technical Data on page 23*.
- Make sure that the power supply is ***externally*** disconnected and that it cannot be switched on. Test for absence of voltage.
- Connect the mains wiring according to the following description.
- Please observe the connection diagrams supplied with the device for options and special versions.

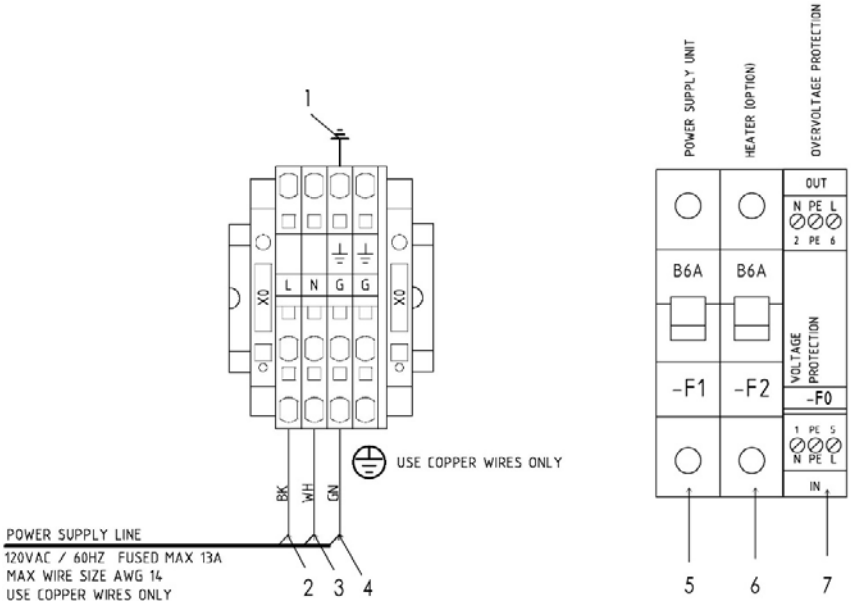

Fig. 26: Terminal block -X0, power distribution box

1 Ground wire, internal/ factory wired
2 Conducting lead, black cable (L)
3 Neutral lead, white cable (N)
4 Ground lead, external, green or green/yellow cable (G)
5 Automatic circuit breaker power supply unit (F1)
6 Automatic circuit breaker heater (F2)
7 Surge arrester (optional)

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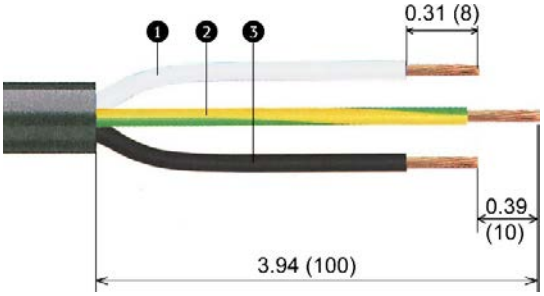
Mains wiring

The mains wiring at the place of installation has to be laid separately from the sub-distribution to the terminal block -X0.

Removing the insulation

1. Make sure that the power supply is externally disconnected and that it cannot be reconnected. Ensure no voltage is applied.
2. If necessary, shorten the mains wiring to the required connection length.
3. Insulate the feeder and the individual wires according to the following illustration. Do not damage the insulation of the individual wires when stripping the wires.



1 Neutral lead
2 External ground lead
3 Conducting lead

Fig. 27: Removing the insulation: Dimensions in inch and (mm)

Connecting the mains wiring

4. Connect the *external ground lead* (green/yellow) to position *G* of the terminal block.
5. Connect the *neutral lead* (white) to position *N* of the terminal block.
6. Connect the *conducting lead* (black) to position *L* of the terminal block.

Checking the mains wiring

7. Check whether all connections are fitted correctly and securely.
8. Check whether the *external ground lead* is correctly connected to position G of the terminal block.
9. Check whether the factory-wired *internal ground wire* is correctly connected to the device housing.

Automatic circuit breakers

The fuse protection of the connected device voltage is carried out by the automatic circuit breakers .

The automatic circuit breakers can, after switching on the power supply at the place of installation, be switched on for testing purposes (position ON, upwards), but they should stay switched off (position OFF, downwards) until final connection.

8.3 Ethernet Connection (terminal block -X2 or additional mounting rail)

Defective data transmission

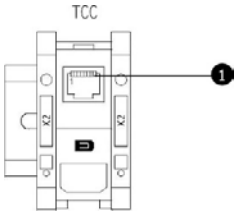
NOTICE

Inappropriate connection can cause defective data transmission.

- Connection has to be carried out by DESIGNA electrical technicians or electrical technicians of DESIGNA trained and authorized partners.
- Check the already used assignments of the **Ethernet** connections in your system. These can be conducted according the standards *EIA/TIA-T568**A*** or *EIA/TIA-T568**B***.
- Observe the chosen assignment for all Ethernet connections in your system.
- Clamp the Ethernet connection ***tightly*** (top and bottom) onto the mounting rail. This creates the required grounding and ensures trouble-free operation of the data line.
- Please pay attention to the enclosed instructions for preparation, wiring and mounting of the *Ethernet connection* as well as to the following description.
- Do not damage the insulation of the individual wires when stripping off the sheath.

The **Ethernet** (**LAN)** line is connected to the *Ethernet connection*.

The component *Ethernet connection* is part of the scope of delivery and is wired and mounted on site to a free location of the mounting rail



1 Ethernet connection -> TCC/SBC [6]

Fig. 28: Terminal block -X2; Ethernet connection

More than one *Ethernet connection* can be necessary depending on the device equipment (e.g. VoIP intercom device).

Connecting Ethernet

1. If necessary, shorten the wires of the Ethernet data line to the required length.
2. Strip off the sheath of the Ethernet data line in order to wire up the wires individually.
3. Carry out wiring and installation as described in the instructions supplied with the *Ethernet connection*.
4. Attach tightly the present connection cable of *terminal block -X2* to the *Ethernet connection-> TCC/SBC*.

[6] or another controller board (e.g. at the DCT 120

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Assignment according to EIA/TIA-T568A

If ***no*** assignment has already been used or if the standard *EIA/TIA-T568**A*** is already assigned, conduct the wiring according to *EIA/TIA-T568**A***:

> **i** The wiring according to standard *EIA/TIA-T568**A*** is described in the instructions enclosed to the *Ethernet connection*.

Pin	Color
1	White/ Green
2	Green
3	White/ Orange
4	Blue
5	White/ Blue
6	Orange
7	White/ Brown
8	Brown

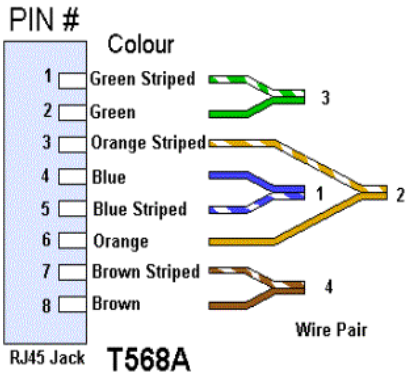


Fig. 29: Assignment of the Ethernet connection, EIA/TIA-T568A

Assignment according to EIA/TIA-T568B

Observe the assignment if it has already been used according the standard *EIA/TIA-T568**B***.

> **i** The wiring in this case is conducted ***against*** the instructions enclosed to the *Ethernet connection*.

⇨ Connect the conductors *green* and *white/green* to the positions 3 and 6 of the conductors *orange* and *white/orange* of the instructions and vice versa:

Pin	Color
1	White/ Orange
2	Orange
3	White/ Green
4	Blue
5	White/ Blue
6	Green
7	White/ Brown
8	Brown

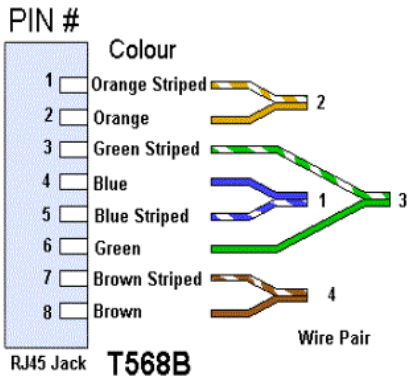


Fig. 30: Assignment of the Ethernet connection, EIA/TIA-T568B

8.4 Connection intercom device (terminal block -X2 or VoIP)

Defective data transmission

NOTICE

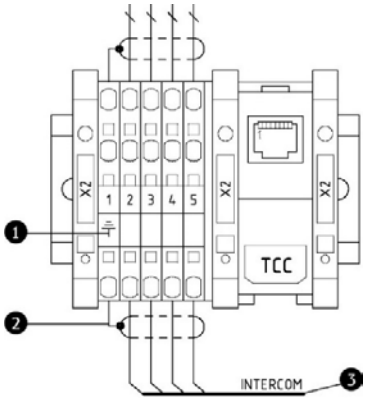
Inappropriate stripping can cause defective data transmission.

- Connection has to be established out by DESIGNA technicians and/ or DESIGNA's authorized partners.
- Be careful not to damage the insulation of the individual wires when stripping off the sheath.

Connection intercom device (terminal block -X2)

If the intercom device requires a 2 or 4-wire *(see chapter 5.2.10 Intercom device on page 29)*, the cable of the intercom circuit is connected to terminal block -X2.

The wiring of the intercom system is carried out star-shaped, i.e. a line is laid from each device PAY CASHLESS to the central switchboard for intercommunication.



1 Protective ground
2 Intercom cable screen
3 Intercom cable

Fig. 31: Terminal block -X2, connection intercom system, with 4-wire connection

1. If necessary, shorten the wires of the *intercom cable* ❸ to the required length.
2. Strip off the sheath of the *intercom cable* ❸ in order to wire up the wires individually.
   Use the wire-braiding as *intercom cable screen* ❷.
3. Remove approx. 0.31 in (approx. 8 mm) of the insulation at the ends of the wires.
4. Clamp the wires to the terminal block.
   2 wires (standard intercom device): terminal positions 2+3
   4 wires (optional two-way intercom device): terminal positions 2-5
5. Connect the *intercom cable screen* ❷ to the terminal *protective ground* ❶, terminal position 1.

Connection intercom system (VoIP)

DESIGNA VoIP

The integrated VoIP intercom device *DESIGNA VoIP* does not require a separate connection during installation.

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Other VoIP intercom devices	An (additional) *Ethernet connection* is used if other optional VoIP intercom devices are installed. Connection: *See chapter 8.3 Ethernet Connection (terminal block -X2 or additional mounting rail) on page 54*.

9 Testing in accordance with accident prevention regulations

Electric voltage

⚠ DANGER

Danger of death due to electric shock!

Direct contact with live electrical equipment is potentially lethal.

– According to the accident prevent regulations testing should only be carried out by fully trained and qualified electricians.

The efficient working order of electrical systems and equipment must always be checked prior to initial start-up, after any changes or repairs and at regular intervals.

In Germany, testing must satisfy the requirements specified by the accident prevention regulations (DGUV-V3). Appropriate regulations apply in other countries. Always comply with the relevant regulations.

9.1 Initial device testing

The device PAY CASHLESS has been tested ex-works in accordance with the accident prevention regulations (DGUV-V3). Testing was carried out in line with recognized standards of good engineering practice[7].

The following tests were executed.

Visual inspection

A visual inspection of the insulation, grounding, strain relief, etc.

Protective grounding conductor test: Measuring the continuity of the protective grounding conductor

This test involved measuring the continuity of the protective grounding conductor. Relevant measurements are carried out between the protective grounding conductor/main device connection and specified measuring points *(see chapter 9.2 Measuring points for the protective grounding conductor test on page 59)*.

Measuring the fault loop impedance

This test involved measuring the resistances of the entire outward and return path of an electric circuit. The measurements were carried out between the line conductor and protective grounding conductor and the line conductor and neutral conductor using an installation tester*(see chapter 9.3 Measuring points for the fault loop impedance measurement on page 60)*.

Measuring the insulation resistance

Initial testing of the insulation resistance has been carried out using a leakage current meter and the differential method.

Dielectric withstanding voltage test

The dielectric withstanding voltage test serves for testing the electric insulation capability and electric strength of the device.

Documenting the tests

All the tests have been documented in a report on initial device testing.

[7] In Germany, e.g., DIN VDE 100 Part 600

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9.2 Measuring points for the protective grounding conductor test

The following measuring points have been specified for measuring the continuity of the protective grounding conductor. The measuring points are indicated by yellow labels. If a grounding rod is specified as a measuring point, the measurement is carried out at the top of the grounding rod (not at the protective grounding conductor).

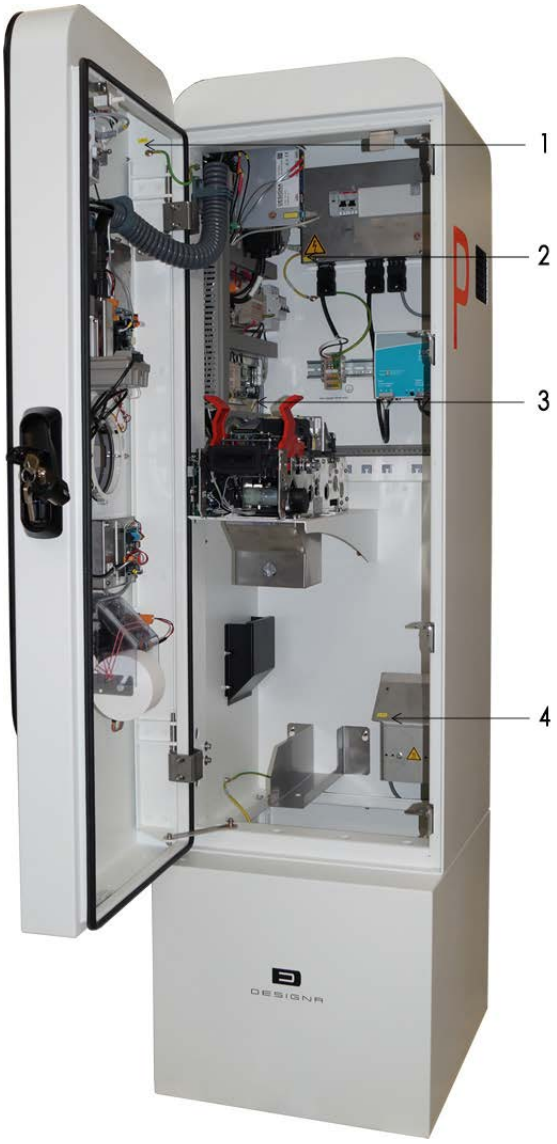

Fig. 32: Measuring points

1 Measuring point TP2: Pin at the door
2 Measuring point TP3: Grounding rod at the power distribution box
3 Measuring point TP8: Grounding rod at the mounting plate with 24 V components
4 Measuring point TP4: Metal housing of the heater (optional)

Not shown:

5 Measuring point TP1: Grounding rod in the pedestal (left-hand)

9.3 Measuring points for the fault loop impedance measurement

The following measuring points have been specified for measuring the fault loop impedance.

Fig. 33: Measuring point for measuring the fault loop impedance

1 Socket power supply unit (X10) at the power distribution box

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10 Commissioning

Electric voltage

⚠ DANGER

Danger of death due to electric shock!

Contact with live components may result in death.

– Commissioning has to be carried out by Designa electrical technicians or electrical technicians of Designa trained and authorized partners.

Commissioning is carried out on-site according to the respective requirements of your system and is therefore not described in these operating instructions.

11 Function Check

11.1 Safety

Electric voltage

⚠ DANGER

Danger of death due to electric shock!

When the device is switched on, the main power voltage (120V) is applied to the following components: Power distribution box, terminal block -X0, power supply unit and to the optional heater and thermostat and, if necessary, to further optional components *(see chapter Device Description)*.

- Only specially instructed **shift managers** are allowed to carry out certain maintenance and filling work ***inside*** the device.
- Switch off the device *(see chapter 5.3.4 Power distribution box on page 35)* unless the work step requires a voltage supply.
- Be aware that the terminal block -X0 and the power distribution box remain energized (120V) even when the automatic circuit breakers are switched off.

11.2 Check condition of device

1. Check completeness of the safety labels *(see chapter 2.6.1 Product safety labels on the device on page 17)*. Consult your Designa service if any are missing or the quality is below standard.
2. Check the quality of the device components.
   Consult your Designa service if any damages are visible.
3. Make sure the device components are fitted correctly.
   Tighten any loose screw connections.
4. Check that the plug and clamping connections are connected correctly.

11.3 Induce general function and check

1. Switch on the PAY CASHLESS: *(see chapter 5.3.4 Power distribution box on page 35)*.

   ➤ The PAY CASHLESS “boots (starts and sets the device components ready for functional operation) and is subsequently ready for operation.[8]

   A connection to the **System server** is achieved via the **Ethernet**: If no **device configuration** is yet assigned to the **TCC/SBC**, the TCC/SBC is registered with a request in the system. The assignment is then carried out with the function *Search new TCC/SBC* at the **WinOperate** *(see separate manual Main Menu Settings)*. The device is now **online**.

   The device specific program and further necessary data (e.g. rate information) for operation are transferred to the **TCC/SBC** (if problems

[8] The first booting can take up to 7 minutes.

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occur, “Reset 8” can be sent from WinOperate to the device (please note duration))

The PAY CASHLESS carries out a self-test: The standby of the device components is checked.

2. Check at the WinOperate whether **alarm messages** occur for the newly installed device and its device components.
3. Insert the **function card** No. 2 (*TCC/SBC in operation*).

➤ The device is now in its normal operating mode. Please contact your DESIGNA service if problems arise during the function check.

11.4 Prepare optional lost ticket

1. Remove enough tickets from a ticket magazine (accessories, e.g. entrance control terminal).
2. Place these in the *ticket storage Lost ticket* and insert the first ticket into the reading device.
   Insertion of tickets: *See chapter 17.3.2 Insert new ticket belt on page 103 and 18.3.2 Insert new ticket belt on page 117.*

11.5 Check other device components

Test intercom device

1. With the operator or another Technicians help, test the intercoms sound and speech quality to verify the duplex connection is fully functioning.

Check heater (optional)

⚠ CAUTION

Hot surface!

The surface of the heater may become hot during operation.

Contact with the heater may result in burns.

– Do not touch the surface of the heater.

ℹ The thermostat is not pre-set on delivery. The desired temperature has to be set before commissioning. Recommended temp.: 68°F (20°C)

1. For this, adjust the control knob of the thermostat to a higher temperature setting and make sure that this activates the heater.
2. Afterwards, turn the control knob of the thermostat back to the starting position.

Check fan (optional)

1. Adjust the blue control knob of the (fan) thermostat to a lower temperature setting and make sure that this activates the fan.
2. Afterwards, turn the control knob of the thermostat back to the starting position.

12 Operation

As part of the ABACUS system the PAY CASHLESS serves as an automatic pay station system: It is possible to pay the incurred parking fee, e.g. for a **transient ticket**, exclusively cash-free (debit cards or credit cards or other payment medium valid for the system, e.g. **value checks**).

After paying the parking fee (e.g. for a **transient ticket**) the customer's ticket is coded with an **exit authorization** and the customer can then leave the parking facility, e.g. at an exit control terminal where the exit authorization is checked.

Various processes can be carried out at the PAY CASHLESS:

- Payment of transient tickets
- Evaluation of validations
- Renewal of monthly cards
- Charging of value cards
- Additional payment of monthly or value cards
- Additional payment of a prebooking (optional)
- Pay-by-Plate (optional)
- Smart Ticket Shop (optional)
- Receipt printout
- Issue of lost tickets (optional)
- Issue individual parking permissions on the device (optional)
- Requesting card parameters
- Trigger functions with function cards

These processes as well as possible error status recognition at the PAY CASHLESS are described below:

- Recognize error status

All the information for processing is contained on magnetic stripe tickets: Thus, processes with magnetic stripe tickets are **offline compatible**.

However, the information for processing is only partially available on barcode tickets: Therefore, some processes are only partially **offline compatible** with barcode tickets. These restrictions are, if applicable, described below or in the operator manual *WinOperate*.

For credit card (or similar) and **RFID** processes the information about processing is in the **System server**. Actions with these media are therefore based on an **online** connection.

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12.1 Payment of transient tickets

Transients are customers who request a **transient ticket** at an entrance and subsequently enter the parking facility with this ticket. After paying the parking fee the customers are free to exit the parking facility. The fee depends on the parking duration.

In order to pay for the transient ticket it has to be inserted into the **Multicon**.

The parking fee is calculated and displayed on the basis of the ticket's entrance information and the system's rate information. The PAY CASHLESS is now ready to accept payments.

Depending on the optional equipment of the PAY CASHLESS, the customer now has the possibility to use various mediums to pay the incurred parking fee:

- Credit cards, debit cards or similar cards (optional)
- Value/Time checks (optional)

Paying with credit or debit cards (optional)

Optionally, credit or debit cards can be used as payment medium.

> **i** For credit card (or similar) processes the information about processing is in the **System server**. Actions with credit cards are therefore based on an **online** connection[9] between the device and the System server: Information about each action is requested.

Customers use their credit cards or debit cards at the credit card reader, PIN pad terminal or NFC. The magnetic stripe, chip or NFC chip is read, a hash value[10] of the card is determined and sent to the **system server**. There the data is saved together with the respective payment information in a separate file until credit card settlement takes place *(see the separate operator manual WinOperate for more information on how to carry out credit card settlement)*.

During payments with credit cards the *Cancel* button can only be used to cancel the process after the parking fee has been displayed.

If the parking fee has been paid an **exit authorization** for the ticket is assigned taking the current system settings into consideration (e.g. parking facility no., **system times**).

A receipt of the payment process is ***always*** issued after payment with a credit card (or similar card) in the standard setting. If credit card users should be required to request a receipt, this option can be set in the **device configuration**.

If an additional fee is required when using a credit card to pay for a parking facility ticket, it will be shown separately on the receipt.

[9] Credit card payments (up to 7) can also be accepted if the device is **offline** (actions are saved in the **TCC**). This is set in the **device configuration**. Recommended: Only accept credit card actions if the device is **online** (standard).

[10] Bank debit card numbers are stored in the system as hash values and are therefore encrypted.

Paying with value/time checks (optional)

Optionally, **value checks** or **time checks** can also be used as payment medium.

These are ABACUS tickets with a certain money or time value. They are used at the PAY CASHLESS to pay the incurred parking fee: When used at Automatic Pay Stations or Exit Control Terminal (**drive&pay**) the parking fee or the parking duration is reduced by the money or time value respectively.

A setting in the **device configuration** determines whether customers can use only ***one*** value/ time check as payment medium at the PAY CASHLESS or an unlimited amount.

Customers have to insert their tickets and subsequently the value/ time checks into the Multicon. The coded money / time value is deducted from the parking fee and the current remaining amount is displayed. This can then be paid, if necessary, using other payment mediums (see above) or further value checks (configuration).

Overpayment using value/time checks occurs if the parking fee or parking duration is less than the money or time value (e.g. parking fee = $1.50 / coded value = $2.00). Overpayment via value/time checks ***cannot*** be refunded as change [11].

If further payment occurs with coins or banknotes, the return of change is possible.

If a customer presses the *Cancel* button during payment with a value/time check, the process is cancelled and the already inserted amount is credited to the ticket [12].

If the parking fee has been paid an **exit authorization** for the ticket is assigned taking the current system settings into consideration (e.g. parking facility no., **system times**). The value/ time checks are withdrawn. For this there is a *collecting box value checks* underneath the **Multicon**.

The ticket is returned from the reading device.

The customer can request a receipt for the payment by pressing the *Receipt* button.

[11] The place which gives the checks to customers (e.g. a participating shop) can only be charged for the amount of money/time actually used (here: $1.50) *(see Glossary/ Value checks as well as the separate operator manual WinOperate)*.

[12] Only possible **online** for barcode tickets: The advance payment is credited to the ticket at the **system server**.

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12.2 Evaluation of validations

Various types of discounts can be issued in the ABACUS system and evaluated at the PAY CASHLESS:

- Hole punch validation (magnetic stripe and barcode technology)
- Coded validation (only magnetic stripe technology)
- Rate switch card for switching to discounted rate (only magnetic stripe technology)

Hole punch validation (magnetic stripe and barcode)

The PAY CASHLESS reading device recognizes a validation mark which has been punched into a transient ticket with an ABACUS hole-punch or a ABACUS ticket-punch. Up to three validations can be punched into a transient ticket. The validation is accounted for during the rate calculation: The parking fee for this ticket is based on an additionally set validation rate (*customer hole*).

Coded validation mark (only magnetic stripe)

Validation marks in magnetic stripe systems can be coded via special validation devices (e.g. TCU 120 or similar).

If a validation mark has been coded onto a transient ticket it is read by the Multicon at the PAY CASHLESS. The validation mark is accounted for during the rate calculation: The parking fee for this ticket is based on an additionally set validation rate (*customer hole*, *GID* or *another parking facility number*) or subtracted a defined amount.

> **i** For some coded validation marks in the ABACUS system, magnetic stripe tickets with a wide central stripe (12 mm) and a Multicon with corresponding read heads are required. Please read the separate instructions of the validation devices for more information about this and the validation processes.

Rate switch card for switching to discount rate

If magnetic stripe technology is available at the Multicon (e.g. also in addition to the barcode reader), customer, membership or credit cards can be defined as *rate switch cards.* This allows a parking facility customer with this type of card to be offered a less expensive rate.

The customers use their cards to *switch to* a less expensive rate during payment at the PAY CASHLESS. After inserting the transient ticket the customer has to subsequently insert the rate switch card, which is recognized by the system, the parking fee is then based on an additionally set discount rate.

12.3 Renewal of monthly cards

Some item details can only be checked **online** in barcode systems (e.g. validity). Therefore, barcode monthly cards are refused **offline**, unless the barcode system configuration allows monthly cards to enter and exit the parking facility offline.
This means certain item details are not checked offline (e.g. **validity**, **group time**). However, renewing always requires an **online** connection.

Monthly parkers are customers who wish to use the parking facility over a longer period of time and usually pay the incurred rate as a lump-sum in advance. In this case, the monthly parkers receive a **monthly card** as entry medium, e.g. a plastic card with magnetic stripe or pre-printed barcode, an **RFID** card, or their credit card is listed in the system as a monthly card.

Monthly cards are allocated certain validities. If monthly card self-**renewal** is permitted, customers can renew the cards themselves at the PAY CASHLESS during specified times before and after expiry of the cards' validity.

In order to renew the monthly card it has to be inserted into the Multicon or brought close to the **RFID** antenna.

The fee for a card renewal is calculated and displayed due to the card's group and item information (coded onto magnetic stripe cards; defined in the **System server** for barcode cards, **RFID** cards or credit cards).

The PAY CASHLESS is now ready to receive payments.

The customers can now use various mediums to pay the incurred parking fee depending on the PAY CASHLESS equipment.

If the renewal fee has been paid, new data is allocated to the card taking the current system settings (e.g. **monthly parker group**) into consideration (coded onto magnetic stripe cards; defined in the **System server** for barcode cards, **RFID** cards or credit cards).

If necessary, the card is returned from the reading device.

The customer can request a receipt for the payment via the Receipt button. [13]

[13] A receipt of the payment process is ***always*** issued after payment with a credit card (or similar card) in the standard setting.

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12.4 Charging value cards

Some item details can only be checked **online** in barcode systems (e.g. *validity*). Therefore, barcode value cards are refused **offline**.

Value cards are assigned with a certain value (sum of money): This is coded onto the magnetic stripe or assigned to the card at the **System server** (Barcode + **RFID**). The incurred parking fee is deducted from the value card when exiting the parking facility. Value cards can be, e.g., plastic cards with magnetic stripe or pre-printed barcode or **RFID** cards.

If value card **charging** is possible (value card **item** details: *see separate operator manual WinOperate*), the customer can charge a new (fixed) sum of money onto the value card at the PAY CASHLESS when the original value has been spent.

The value card **item** activated for this purpose is always the item activated as *Use at TCC*, irrespective of the previously allocated item for this card, when charging cards at the PAY CASHLESS. (Setting *Use at TCC* in the item details: *Please also read the separate operator manual WinOperate*.)

To renew a value card it has to be inserted into the Multicon twice or brought closer to the **RFID** antenna.

The fee for charging is displayed based on the item details.

The PAY CASHLESS is now ready to receive payments.

The customers can now use various mediums to pay the incurred parking fee depending on the PAY CASHLESS equipment.

If the charging fee has been paid, new data is allocated to the card taking the current system settings (e.g. item details, parking facility no.) into consideration (coded onto magnetic stripe cards; defined in the **System server** for barcode cards or **RFID** cards).

The card is returned from the reading device.

The customer can request a receipt for the payment via the *Receipt* button. [14]

[14] A receipt of the payment process is ***always*** issued after payment with a credit card (or similar card) in the standard setting.

12.5 Additional payment of monthly or value cards

The additional payment of barcode monthly or value cards is only possible **online**.

Additional payment can be necessary for monthly cards or for value cards.

A **monthly card** is charged an additional fee if the monthly parker is still in the parking facility when the validity of the card expires. In this case, the rate is calculated from the end of the validity period to the time of payment. Otherwise, the monthly card is withdrawn and marked as deleted at the exit. A monthly card has to be additionally paid for if parking occurs outside the **group time**. On which rate this additional payment is based depends, in both cases, on the configuration of the monthly parker group. A transient rate is used if no special rate has been defined for additional payment.

A **value card** is charged an additional payment if the parking fee exceeds the residual value of the value card (if permitted by the *item details* of the value card: *see separate operator manual WinOperate*). The customer has to pay the difference at the PAY CASHLESS.

To carry out additional payment the monthly or value card has to be inserted into the Multicon or brought closer to the **RFID** antenna.

The fee for additional payment is calculated and displayed due to the card data (coded onto magnetic stripe cards; defined in the **System server** for barcode cards, **RFID** cards or credit cards).

The PAY CASHLESS is now ready to receive payments.

The customers can now use various mediums to pay the incurred parking fee depending on the PAY CASHLESS equipment.

If the fee for additional payment has been paid, new data is allocated to the card taking the current system settings (e.g. **system times,** parking facility no.) into consideration (coded onto plastic magnetic stripe cards; defined at the **System server** for **RFID** cards or barcode cards).

If necessary, the card is returned from the reading device.

The customer can request a receipt for the payment via the *Receipt* button. [15]

[15] A receipt of the payment process is ***always*** issued after payment with a credit card (or similar card) in the standard setting.

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12.6 Additional payment of a prebooking (optional)

If the prebooking option is available in the ABACUS system, parking facility customers can carry out **prebookings**: a planned stay in a parking facility can be booked and paid for in advance via a web application, e.g. at the parking facility operator's website, or via a smartphone park app.

Various **ID media** can be used at the device, printed barcode, print@home ticket with QR Code (Quick Response Code), smartphone with QR Code, credit card; customer cards or number code[16], etc.

Additional payment will be required for a prebooking if the parking facility customer remains in the parking facility after the validity of the prebooking has expired. In this case, a rate is calculated for the period from the end of validity to the time of payment.

The **ID medium** is used for additional payment at the PAY CASHLESS device. The information is read and requested from the **system server**. The data is then used to calculate and display the additional payment fee.

The PAY CASHLESS is now ready to receive payments.

The customers can now use various mediums to pay the incurred parking fee depending on the PAY CASHLESS equipment.

Once the additional payment fee has been paid, the new data is allocated to the ID medium whilst taking the valid system settings (e.g. **system times**, parking facility no.) into account.

The customer can request a receipt for the payment via the *Receipt* button. [17]

[16] Not available at BlueEdition devices.

[17] A receipt of the payment process is ***always*** issued after payment with a credit card (or similar card) in the standard setting.

12.7 PAY BY PLATE (optional)

The PAY BY PLATE function is part of the DESIGNA Ticketless concept. The license plate number recognized by LPR cameras serves as an identification medium in the parking system for entry, payment and exit.

At the entrance, the system automatically registers the license plate as an access medium along with the corresponding entry data.

When entering the license plate number at the automatic pay station, this entry data is compared with the data stored in the system. The registered license plate with the corresponding entry data is used as the basis for payment at the pay station.

At the exit, the license plate is read automatically and the data is checked in the system.

For more information, see separate instructions Full-Touch Display.

12.8 PARK SHOP (optional)

In the ABACUS system, a PARK SHOP can be set up at the automatic pay stations. With the corresponding license, the PARK SHOP function can be called up on the touch display at the pay station. At the PARK SHOP the parking lot customer can buy parking permissions at a fixed price for a predefined time period (e.g. a day ticket)

Parking permissions issued in the PARK SHOP are set up in the system as Vending machine items.

Two function variants can be configured in the system:

Vening machine

The parking lot customer taps the Buy Ticket button on the pay station display and selects the ticket with the required validity at a fixed price. After paying the displayed amount, the parking lot customer uses the issued ticket to enter the parking lot. The ticket can now be used according to its validity for the corresponding time period. An additional payment will be required if the valid time period is exceeded.

Recode[18]

The parking customer takes a transient parker ticket at the entrance or drives in via license plate recognition. For payment, the customer inserts the ticket into the pay station or enters the license plate number. The amount due is displayed. The parking customer taps on the *Recode* button and can then select the vending ticket with the desired validity period at a fixed price. After payment, the car park customer receives a recoded monthly parker ticket or, in a ticketless system, can use their license plate number in accordance with the recoding information.

For more information, please refer to the separate Smart PARK SHOP user manual.

[18] From system version X24.3

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12.9 Issue receipt

Receipt printout upon request

After the payment process, tapping the *Receipt* button triggers a receipt printout. The receipt can be printed until the button disappears (approx. 30 seconds).

Subsequent receipt printout

The last ten unrequested receipts are stored in the ring buffer of the **SBC/TCC**.

If the parking lot customer did not request a receipt during the payment process, this function provides the customer with the opportunity to print out the receipt at a later date. If the ticket is re-inserted into the device after payment, the receipt is printed out automatically. This process can only be executed once. It is only possible if the requested receipt is one of the last ten unrequested receipts stored in the ring buffer.

Automatic receipt printout

In the configuration, you can specify whether a receipt is issued by default in your system when paying with girocards and credit cards. It is also possible to suppress automatic receipt printout for individual debit and credit cards in the credit card configuration.

Digital receipt

The digital receipt can be set as default in the configuration for the entire parking system.[19] After payment, a QR code is automatically displayed on the full-touch display, which can be scanned with the camera app to read the receipt. The receipt is downloaded as a PDF file via a link.

Fig. 34: Full touch display Digital Receipt

[19] from ABACUS system version X25.4

1. Scan the QR code with the camera app.
2. Open the link.

➤ The receipt is displayed as a PDF file and can be saved separately and printed out.

⇨ Tap *Wait* to extend the display period for the QR code.

⇨ Tap *Close* if you do not want to digitally call up the receipt.

See also the chapter 'Display receipt details and print copy' in the separate WinOperate user manual.

12.10 Issue of lost tickets (optional)

A **lost ticket** can be issued to customers who claim to have lost their ticket. To avoid abuse of this function a price is usually charged which corresponds to the per diem rate.

Lost tickets can be optionally request via the *Lost ticket* button. For this function the PAY CASHLESS has to be equipped with a respective Multicon and a ticket storage receptacle. Furthermore, the issuing of lost tickets must be allowed in the **device configuration**:

The customer presses the *Lost ticket* button, the fee is displayed and can be paid using the usual payment mediums. The device produces a lost ticket with the current system settings for this **type of item** and subsequently issues it.

Lost tickets can be optionally issued at the PAY CASHLESS via the function *Produce lost ticket* of the **WinOperate.**

See the separate operator manual WinOperate for further information about possible lost ticket settings and the function Produce lost ticket.

12.11 Issue individual parking permissions at the device (optional)

At the customer's request, the operator can issue a personalized **parking permission** at the automatic pay station. This function is available for both ticket-based and ticketless parking systems.

Functional Description

The parking lot customer enters by taking a transient parker ticket at the entrance or via license plate recognition. At the automatic pay station, the parking lot customer then wants to purchase, for example, a day ticket or a multi-day ticket.

To do this, the parking lot customer contacts the operator via the device's intercom. The operator uses the WinOperate software to generate a parking permission (e.g. a congress ticket) and sends the ticket information to the desired device using the *Produce cards* function. The fee is displayed and can be paid using the usual payment methods.

After payment, depending on the device's specifications, the ticket is printed via the Multicon or the receipt printer, or, in ticketless systems, is assigned to the license plate.

Please refer to the separate WinOperate user manual for further information on the available settings for creating tickets and the produce cards function.

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12.12 Requesting card parameters

Blacklist check

In the ABACUS system the **blacklist** serves to register undesired tickets and cards at the devices. Tickets can either be put on the blacklist automatically by the system (**card not entered**) or manually *(see the separate operator manual WinOperate)*.

The **blacklist check** can be switched on or off for each device at the operating interface of the **WinOperate**. If the blacklist check for the device is switched on, the entered ticket is checked to see whether it is on the blacklist or not. Listed tickets are either rejected or withdrawn.

If the blacklist check is switched off, the device also accepts cards on the blacklist.

I/O-check

The **I/O-check** (Inside/Outside-check) checks the **I/O-identification** of the ticket: For the I/O-identification of a ticket, the last used device (**TCC/SBC number**) is coded as magnetic information onto the ticket or (barcode, credit cards, **RFID** etc.) defined as information in the **System server**. Tickets with incorrect I/O-identification are rejected and marked as deleted or withdrawn.

If the ticket was last used at an Entrance or Pay Station, it is "inside" and next use, if the I/O-check is switched on, has to occur at an Exit (or Pay Station). If the ticket was last used at an Exit next use has to occur at an Entrance or Pay Station.

The I/O-check can thus stop several vehicles being taken out of the parking facility with one card (e.g. if two exits, one after the other, are attempted with the same card without an entrance having been used in the meantime) because, after using the card *once* at an exit, next use has to be at an entrance.

For **credited monthly parkers** the I/O-check always has to be switched on otherwise no rate calculation occurs *(see separate operator manual WinOperate)*.

If the barcode system configuration allows monthly cards to enter and exit the parking facility **offline**, there is no offline I/O-check.

12.13 Trigger functions with function cards

Besides normal operation it is possible to trigger certain functions at the PAY CASHLESS with **function cards**. For this, the loop V has to be unoccupied

If the PAY CASHLESS has to be temporarily taken out of service due to an error status, it can be done using the function card 01 *TCC/SBC out of service*: No further functions are carried out and the display shows the message *Out of service* .

The reading device remains active, so that the device can be put back into operation using the function card 02 *TCC/SBC in service*. This function can also occur via the command *Device in service* at the **WinOperate**.

See the separate operator manual Function cards for further functions and the handling of the function cards.

12.14 Recognize error status

If errors or shortages occur with any of the device components, they are registered as a signal at the TCC/SBC. The TCC/SBC generates corresponding alarm messages and these are sent to the System server.

The WinOperate displays an occurred device alarm message, detailed information can be requested via the *alarm message overview* of the device *(see the separate operator manual WinOperate).*

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13 Filling and Emptying

13.1 Safety

Electric voltage

⚠ DANGER

Danger of death due to electric shock.

Filling and emptying is carried out with the device switched on.

When the device is switched on, the main power voltage (120V) is applied to the following components: the power distribution box, the terminal block -X0, the power supply unit and to the optional heater and thermostat and, if necessary, to further optional components *(see chapter Device Description)*.

Contact with live components may result in death.

– Only specially instructed **shift managers** are allowed to carry out certain maintenance and filling work ***inside*** the device.

13.2 Tickets and rolls

13.2.1 Filling Supply of tickets Lost Ticket (optional)

1. Check the supply of tickets in the lost ticket.
2. If necessary, replace the loaded ticket belt or have a ticket belt ready, if an imminent exchange is expected.
   Please pay attention to the insertion direction of the tickets into the reading device when replacing the belt *(see chapter 17.3.2 Insert new ticket belt on page 103)*.

13.2.2 Value and time checks (optional)

1. Empty the *value checks collecting box*.

13.2.3 Replacing the receipt roll

1. Check the supply of paper on the receipt roll.
2. If necessary, replace the receipt roll or have a paper roll ready, if an imminent exchange is expected *(see chapter 19.4.2 Insert new paper roll on page 125)*.

14 Maintenance

14.1 Safety

Electric voltage

⚠ DANGER

Danger of death due to electric shock!

Contact with live components may result in death.

- Certain maintenance work may be carried out by Designa trained **shift manager** familiar with the operating instructions and safety instructions. All other maintenance work has to be carried out by Designa electrical technicians or electrical technicians of Designa trained and authorized dealers and partners and is marked accordingly.
- Switch off the device unless the work step requires a voltage supply.
- Keep moisture and dust away from live parts. Moisture or dust can cause a short circuit. If maintenance is carried out during precipitation, e.g. rain or snow, prevent the penetration of moisture using suitable measures such as a protective cover.

Inappropriate cleaning

⚠ WARNING

Risk of injury from inappropriate cleaning!

Inappropriate cleaning can cause severe or lethal injuries.

- Only trained **shift managers** are allowed to carry out cleaning ***inside*** the device as indicated and described in this chapter.
- If any other servicing is needed, please contact your Designa electrical technicians or electrical technicians of Designa trained and authorized dealers and partners. (For contact: see the beginning of this operating manual).
- Make sure that cleaning fluids are neither swallowed nor come into contact with eyes.

Inappropriate cleaning with air pistols

⚠ CAUTION

Risk of injury due to inappropriate cleaning with air pistols!

Inappropriate cleaning with air pistols may result in minor injuries or damage to eyes due to flying particles.

- Always wear safety goggles.
- Prevent air penetrating the body through skin injuries.
- Do not aim air pistols at people.
- Only use air pistols with a maximum pressure of 50.8 psi (3.5 bar).
- Only use air pistols with a reduced noise level (multi-hole nozzles).

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Inappropriate cleaning

NOTICE

Inappropriate cleaning can result in damage to the device.

There are sensitive electronic components inside the device.
Dust and moisture can have a negative effect on the accuracy and the service life of the individual components.

Aggressive cleaning agents and auxiliary materials can damage or destroy the components or surface coating of the housing.

- Always keep the inside of the device clean and ensure that no moisture enters into it.
- If necessary, completely wipe off any water from the housing or door before opening the device.
- Do not use aggressive cleaning agents, such as thinners or cleaning solvents, to clean the device.
- Do not use any steam cleaners or high-pressure cleaners.

Personal protective equipment

The following must be worn during all work:

- Work clothes
- Protective gloves
- Safety shoes

14.2 Cleaning items

The following cleaning items can be ordered from DESIGNA:

DESIGNA order no.	Description	Table of contents
7232148932	Cleaning tickets for Multicon MC 120	10 tickets
7232148935	Cleaning strips for receipt printer	15 strips
7232148939	Cleaning set for PIN pad	2 cleaning tickets with moving slider 3 pre-soaked cleaning tickets
7232148941	Cleaning cloths soaked with plexiglass cleaner	10 cloths
7232148915	Cleaning fluid	100 ml
7232148909	Compressed air spray	400 ml
7232148929	Cleaning starter kit	1 microfiber cloth 1 small cleaning ticket for MC 100/120 1 large cleaning ticket for MC 120 1 compressed air spray 100 ml 2 disinfectant cloths

14.3 Maintenance Schedule

The following sections describe maintenance work that is necessary to guarantee reliable and trouble-free operation.

Certain maintenance work may be carried out by Designa trained operating personnel familiar with the user manual and the safety instructions, called **shift manager** in this manual. All other maintenance work may only be carried out by Designa electrical technicians or electrical technicians of Designa trained and authorized dealers and partners and is marked accordingly.

Maintenance intervals are given in months or cycles, depending on whichever comes first.

The maintenance intervals should be seen as approximate values and may differ depending on the ambient conditions and frequency of use.

If an increase in contamination is detected during routine inspections, the specified maintenance intervals must be shortened on the basis of the actual level of contamination.

Perform maintenance work during periods of low traffic so as not to interrupt normal service.

Have replacements of the individual components at the ready so that they can be replaced as part of extensive maintenance work.

If you have any questions about maintenance work and intervals, contact your Designa Service.

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14.3.1 General maintenance

	Required qualification		Maintenance intervals							
	Shift manager	DESIGNA electrician	Weekly	Monthly	Every 2 months	Every 3 months	Every 6 months	Every 12 months	Every 4 years	According to cycles
Visual inspection of device and components	x					x				
Checking safety relevant user guidance stickers and images *See Checking safety labels on page 87*	x			x						
Housing *See Cleaning the housing on page 87*										
Check door locks and bolts for ease of movement	x					x				
Check illuminant (e.g. lightning attachment, dispensing tray), replace if necessary	x					x				
Clean housing exterior	x						x			
Clean front plate	x						x			
Clean device interior	x							x		
Adjusting device door, grease hinges	x							x		
Check door switch	x							x		
Check tariff field for damage	x							x		
Check the device interior and exterior as well as all the fastening materials for damage and corrosion and, if necessary, eliminate corrosion damage, touch up paintwork		x						x		
Make sure the housing and bolt connections are secured firmly		x						x		
Display *See Cleaning display on page 88*										
Clean display and check it for damage	x					x				
Check presentation of all display segments, set intensity	x					x				

	Required qualification		Maintenance intervals							
	Shift manager	DESIGNA electrician	Weekly	Monthly	Every 2 months	Every 3 months	Every 6 months	Every 12 months	Every 4 years	According to cycles
Check firmware version of the display, update if necessary		x						x		
Checking intercom and speech connection *See Checking speech contact on page 88*	x						x			
Connection, cabling, voltage, grounding										
Check electrical cables for damage		x						x		
Make sure cable connections (terminal strips and plugs) are inserted correctly		x						x		
Visually inspect all the ground connections		x						x		
Measure voltages		x						x		
Checking and adjusting heater (in the winter) *See Checking and adjusting the heater with thermostat on page 88*	x			x						
Checking and adjusting fan (in the summer) *See Checking and adjusting the fan with thermostat on page 89*	x			x						
2D Barcode scanner *See Cleaning the barcode scanner on page 89*										
Check and clean 2D Barcode scanner	x			x						
Check firmware version of the 2D Barcode scanner and, if necessary, update it		x						x		
Cleaning and checking surveillance camera (visual inspection)	x			x						
Cleaning PIN pad *See Cleaning PIN pad on page 89*										
Clean chip contacts using a slider ticket	x		x							
Clean chip and magnetic track reader using a cleaning ticket	x				x					
Check correct functioning	x							x		

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	Required qualification		Maintenance intervals							
	Shift manager	DESIGNA electrician	Weekly	Monthly	Every 2 months	Every 3 months	Every 6 months	Every 12 months	Every 4 years	According to cycles
RFID systems										
Check correct functioning	x							x		
Check EasyMove antenna for damage and, if necessary, make sure it is inserted correctly	x							x		
Alarm system, check function	x							x		
MP3-Modul, check function	x							x		
DSL modem, check function		x						x		
Journal Printer										
Check print function, adjust ticket imprint	x			x						
Replace ink ribbon if necessary	x			x						
Functional test after completion of maintenance		x						x		
Testing to German accident prevention regulation (DGUV-V3) *See Testing in accordance with accident prevention regulations on page 58*		x						x		

14.3.2 Maintenance of modules

	Required qualification		Maintenance intervals							
	Shift manager	DESIGNA electrical technician	Weekly	Monthly	Every 2 months	Every 3 months	Every 6 months	Every 12 months	Every 4 years	According to cycles
Multicon MC 120 *See Maintenance services for the Multicon MC 120 on page 104 and Filling and emptying services for the Multicon MC 120 on page 103*										
Clean ticket transport routes and write(/read) unit using the DESIGNA cleaning ticket	x			x						30,000 tickets
Clean ticket transport routes, write(/read) unit and cutters using compressed air	x			x						30,000 tickets
Clean transport rollers using a microfiber cloth	x			x						30,000 tickets
Clean reading heads and/or barcode glass panel of the write(/read) unit using a microfiber cloth	x			x						30,000 tickets
Clean wire matrix printer head or thermal printer head using a microfiber cloth	x			x						30,000 tickets
Prepare test ticket, check the ticket imprint and, if necessary, change the ribbon cartridge	x			x						30,000 tickets
Prepare test ticket, check the ticket cutting position and, if necessary, readjust it	x			x						30,000 tickets
After completing maintenance work, check that connecting cables are inserted correctly	x			x						
After completing maintenance work, check and align the position of the Multicon insertion slot	x			x						
Check ticket transport routes, write(/read) unit, wire matrix printer or thermal printer and clean thoroughly		x						x		250,000 tickets
Check firmware version and, if necessary, update it		x						x		

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	Required qualification		Maintenance intervals							
	Shift manager	DESIGNA electrical technician	Weekly	Monthly	Every 2 months	Every 3 months	Every 6 months	Every 12 months	Every 4 years	According to cycles
Multicon MC Barcode *See Maintenance services for the Multicon MC Barcode on page 118 and 18.3 Filling and emptying services for the Multicon MC Barcode on page 116*										
Clean ticket transport routes, ticket printer with cutter and barcode ticket reader with compressed air	x			x						30,000 tickets
Clean thermal line using a microfiber cloth	x			x						30,000 tickets
Clean transport rollers using a microfiber cloth	x			x						30,000 tickets
Clean glass panel of the barcode card reader and the mirror using a microfiber cloth	x			x						30,000 tickets
After completing maintenance work, check that connecting cables are inserted correctly	x			x						
After completing maintenance work, check and align the position of the Multicon insertion slot	x			x						
Check firmware version and, if necessary, update it		x						x		

	Required qualification		Maintenance intervals							
	Operating personnel	DESIGNA electrician	Weekly	Monthly	Every 2 months	Every 3 months	Every 6 months	Every 12 months	Every 4 years	According to cycles
TCC *See Carrying out maintenance work at LCC on page 94*										
Check battery (type LCC), replace if necessary	x							x		
Check plug contacts		x					x			
Check battery (type LCC), replace if necessary		x						x		

	Required qualification		Maintenance intervals							
	Shift manager	DESIGNA electrical technicians	Weekly	Monthly	Every 2 months	Every 3 months	Every 6 months	Every 12 months	Every 4 years	According to cycles
Receipt printer *See Maintenance services for the receipt printer on page 126 and Filling and emptying services for the receipt printer on page 124*										
Clean receipt printer with compressed air	x							x		
Clean receipt printer with cleaning strips	x			x						

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14.4 Checking safety labels

Check safety signs

1. Make sure that the safety signs near the device are visible and can always be easily read.

Check safety labels

2. Make sure that the safety labels on the Pay Coinless are visible and can always be easily read.

Check user prompting labels und diagrams

3. Pay attention to good perceptibility of the user prompting labels and diagrams.

14.5 Cleaning the housing

14.5.1 Cleaning the housing exterior

Clean the housing

1. Clean the housing regularly with a soft cloth and a mild cleanser. Clean the housing more often, if there is a high degree of soiling (e.g. dusty environment).

Clean the housing when using gritting salt in the winter

NOTICE

Gritting salt can damage the paintwork of the housing and may result in corrosion.

Clean the outside of the housing monthly with a soft cloth and a mild cleaning agent if gritting occurs in the vicinity.

14.5.2 Cleaning the Plexiglas® front panel

1. Clean the front panel with a soft cloth and a plexiglass cleaning agent.

NOTICE

Do not dry clean the front panel, dry cleaning may cause electrostatic charges to build up.

Do not use any customary microfiber clothes, abrasive agents or aggressive agents like ethyl alcohol or Isopropanol.

Recommended: DESIGNA cleaning clothes, washing-up liquid-water-solution or antistatic plexiglass cleaner.

14.5.3 Clean inside the device

1. Switch off the device.
2. **NOTICE**

   Device might become damaged.

   – Pay attention to cleanliness inside the device and clean it more than once a month if there is a high degree of soiling (e.g. dusty environment).

   – Do not use any aggressive agents like thinners or petroleum ether for cleaning the casing. Recommended cleanser: Washing-up liquid-water-solution.

   Clean the inside of the device regularly with a soft cloth and a mild cleanser.
3. Carefully vacuum inside the device if it is very dirty beforehand.
4. Carefully vacuum the mounting plates.
5. Switch on the device.

14.5.4 Checking the door switch

1. Open the device door and check that an alarm message has been sent to the system server.
2. Pull out the door switch and make sure a closed device door is simulated.

14.6 Cleaning display

1. Clean the display with a soft cloth and a mild cleaning agent Recommended cleanser: antistatic plexiglass cleaning agent.
2. Check the display for any damages.

14.7 Checking speech contact

1. Together with a colleague at the central switchboard for intercommunication, make sure that speech contact is established with the intercom system of the PAY CASHLESS, and check the function and quality of this connection.

14.8 Checking and adjusting the heater with thermostat

Device switched on.

1. If the outside temperature falls below 50°F (10°C), check the functioning of the heater.
   For this, adjust the control knob of the thermostat to a higher temperature setting and make sure that this activates the heater.

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⚠ CAUTION

Danger of burns!

The surface of the heater may become hot during operation.

Contact with the heater may result in burns.

– Do not touch the surface of the heater.

2. Afterwards turn the control knob of the thermostat back to the starting position: 20°C.

14.9 Checking and adjusting the fan with thermostat

1. Set the blue knob of the (fan) thermostat to a lower temperature setting and make sure that this activates the fan.
2. Subsequently rotate the knob of the thermostat back to the original position.

14.10 Cleaning the barcode scanner

⇨ Clean the plexiglass plate of the barcode scanner with a soft cloth and a mild cleaning agent.
Recommended cleanser: antistatic plexiglass cleaning agent.

14.11 Cleaning PIN pad

14.11.1 Cleaning chip contacts using cleaning ticket and slider

Switched on device.

1. Insert the cleaning ticket with the moving slider and the fleece facing up into the ticket reader.
2. Hold the cleaning ticket firmly with one hand and simultaneously move the slider back and forth several times with the other hand.
3. Mark the cleaning process on the field. When you have marked all 12 fields, dispose of the cleaning ticket.

14.11.2 Cleaning chip and magnetic track reader using a cleaning ticket

Switched on device.

1. Insert the pre-soaked cleaning ticket into the card reader.
2. Repeat this process several times.

15 Module TCC (Type LCC)

Functioning

The **TCC** (Terminal Control Computer) manages and controls the device functions with the individual program of a device in the ABACUS system. All TCC are centrally controlled by the **System server** and identified and addressed via IP addresses.[20]

15.2 Design and operation

NOTICE

Incorrect LCC operation may lead to device malfunctioning.

- Ensure that the LCC housing is always closed.
  If the housing is opened, the optimum heat transfer between the processor chip and the housing is no longer guaranteed which can result in the processor chip overheating.
- Avoid unnecessary switching off and on of the device PAY CASHLESS.
  An operating system is installed on the LCC which requires a certain “booting” period after the device has been switched off and on.

The LCC models *LCC (V3)* or *LCC (LX)* can be used.
The LCC model (LX) is marked yellow.

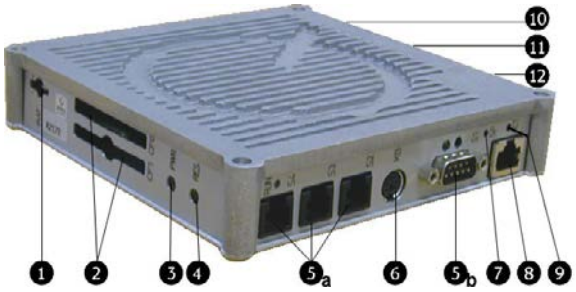

Fig. 35: TCC (Type LCC)

1 Battery
2 CompactFlash slots
3 Power (PWR) button
4 RESET button
5 Serial interfaces
  5a) 3 serial interfaces RJ12
  5b) Serial interface 9-pole D-Sub
6 Interface PS2 (keyboard)
7 LED Speed

[20] The IP addresses are configured for your system by DESIGNA before delivery or by your DESIGNA Service in the *System configuration*.

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8 Ethernet interface, 10/ 100 Mbps, RJ45
9 LED Activity
10 24V power supply
11 62-pole I/O socket
12 2 USB interfaces

Battery

NOTICE

SCC operation with a flat battery may result in loss of data.

The battery has a buffer capacity of approx. 3 months (*LCC V3*) or 4.5 months (*LCC LX*).

- Only use the LCC with an operational battery.[21]
- Replace the battery once a year to ensure its readiness.
- Replace the battery ***before*** the end of a year if the total period of disconnection (e.g. long-term storage) exceeds the buffer capacity of the battery.
- Always use the type of battery specified for the LCC model.
- *Please refer to the chapter 15.3 Carrying out maintenance work at LCC on page 94.*

The *battery* supplies power to the integrated LCC SRAM and the LCC real time clock when the device PAY CASHLESS is switched off or during voltage breakdowns. This prevents data loss when the mains power supply is disconnected.[22]

LCC (V3) Type Varta CR 1216: 3.0V; 27mAh; buffer capacity: approx. 3 months (current consumption at LCC: approx. 10µA (real time clock + 2 SRAM))

LCC (LX) Type: Varta CR 1220: 3.0V; 35mAh; buffer capacity: approx. 4.5 months (current consumption at LCC: approx. 10µA (real time clock + 2 SRAM))

CompactFlash slots

Two CompactFlash memory cards of type I or type II can be inserted. Only slot CF0 is currently used.[23]

The LCC operating system is saved on a CompactFlash memory card by the manufacturer and inserted at slot CF0.

NOTICE

Always leave the CompactFlash memory card in its slot.

Power (PWR) button

The switching off function of the LCC via the *Power button* is deactivated. The LCC can be switched off via the automatic circuit breaker of the device or the (optional) *ON/OFF switch*.

[21] LCC operation without a battery or with a flat battery as well as spikes when replacing the battery may result in an invalid BIOS configuration at the LCC: If an invalid BIOS configuration occurs, rebooting of the LCC after voltage interruption can take up to 15 minutes (BIOS configuration is restored using standard settings).

[22] In **online** mode, TCC data is transferred to and stored at the **System server**.
If the battery is flat, data loss at the device can therefore only occur when the device was **offline** prior to the power failure: Data stored offline at the TCC is then not buffered. (offline + power failure + flat battery).

[23] The slot CF1 is e.g. used for buffering data when the options “Fiscal” or “SmartCard” are used or by DESIGNA service personnel for copying CF cards.

RESET button

By using a thin object (e.g. small screwdriver) it is possible to press the *RESET button*. This triggers a LCC **Reset**, i.e. the operating system is “rebooted” and a program run restart is triggered. This procedure takes approx. 45 sec.

Serial interfaces

The internal device communication takes place via serial connections (RS 232).[24]

Fig. 36: Serial interfaces

Three *serial interfaces RJ12* and one *serial interface 9-pole D-Sub* are available.

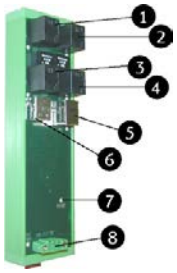
1 COM1 (9pol. D-Sub)
2 COM3 (RJ 12)
3 COM4 (RJ 12)
4 COM2 (RJ 12)

Standard assignment of the serial interfaces

LCC interface	Automatic pay station	Entrance/ exit control terminal	Manual pay station	System configuration
COM1	Option (e.g. BNR 120)	Parallel/ Serial barrier gate	Option	/ttyS0
COM2	Display	Display	Display	/ttyS1
COM3	Banknote reader (BNL)	Option (e.g. EasyMove)	Option (Costumer display)	/ttyS2
COM4	Multicon	Multicon	Multicon	/ttyS3

More than four serial interfaces are required at the automatic pay stations or for ***additional*** options: In this case, the interface extension *USB-4-COM* is used:

Interface extension USB-4-COM (e.g. automatic pay station)



1 S10 (RJ12)
2 S9 (RJ12)
3 S8 (RJ12)
4 S7 (RJ12)
5 USB "Down"
6 USB "Up"
7 LED Power
8 24V power supply

Fig. 37: Interface extension USB-4-COM

The *USB-4-COM* is connected from the *USB “Up”* ❻ contact to the *USB 1* interface (see below) at the LCC.

[24] Possible signal conversion for parallel device components (i.e. older barrier models and complex barrier applications) takes place via the *Module I/O interface* (see separate module chapter).

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USB-4-COM Standard assignment of the serial interfaces (e.g. automatic pay station)

Interface	Standard assignment: Connected components	System configuration
COM 5	Coin processing unit (MVE)	/dev/ttyUSB0
COM 6	(Serial) Receipt printer	/dev/ttyUSB1
COM 7	Option (e.g. **EasyMove**)	/dev/ttyUSB2
COM 8	Option	/dev/ttyUSB3

Depending on the application a second *USB-4-COM* interface extension can be requested. It is connected to *USB "Down"* ❺ of the first *USB-4-COM*. The serial interfaces of the second *USB-4-COM* are assigned customer specifically.

Interface PS2 (keyboard)

Not currently used.

LED Speed

The *LED Speed* displays information about the current status of the **Ethernet** connection: The LED continuously lights up at 100Mbps and goes off at 10Mbps.

Ethernet interface, 10/ 100 Mbps, RJ45

The **LAN** (Local Area Network) is connected to the *Ethernet interface* at the LCC.

LED Activity

The *LED Activity* displays information about the current status of the **Ethernet** connection: The LED displays transmission and reception activity during data transfer.

24V Power supply

The LCC is supplied with 24V DC via the power supply.

62-pole I/O socket

The optional *TFT-Display* is connected to the *62-pole I/O socket*.

2 USB interfaces

If the *USB-4-COM interface extension* is used at the device PAY CASHLESS, it is connected to the *USB 0 interface*.

The *USB 2 interface* is not currently used.

15.3 Carrying out maintenance work at LCC

15.3.1 Safety

Electric voltage

⚠ DANGER

Danger of death due to electric shock!

When the device is switched on, the main power voltage (120V) is applied to the following components: Power distribution box, terminal block -X0, power supply unit and to the optional heater and thermostat and, if necessary, to further optional components *(see chapter Device Description)*.

- Only specially instructed **shift managers** are allowed to carry out certain maintenance and filling work ***inside*** the device.
- Switch off the device *(see chapter 5.3.4 Power distribution box on page 35)* unless the work step requires a voltage supply.
- Be aware that the terminal block -X0 and the power distribution box remain energized (120V) even when the automatic circuit breakers are switched off.

Occupational safety and environmental protection

⚠ WARNING

Risk of harm to humans and the environment as a result of improper disposal of rechargeable batteries and batteries.

Improper disposal of rechargeable batteries and batteries can be harmful to human health and the environment.

- Remove batteries and rechargeable batteries from all the components.
- Dispose of the batteries and rechargeable batteries according to valid country-specific environmental regulations.

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Replacing the battery

NOTICE

LCC operation without a battery or with a flat battery may cause data loss.

The buffer capacity of the battery is approx. 3 months (*LCC V3*) or 4.5 months (*LCC LX*)).

- Only use the LCC with an operational battery.[25]
- Replace the battery once a year to ensure its readiness.
- Replace the battery before the end of a year if the total period of disconnection (e.g. long-term storage) exceeds the buffer capacity of the battery (3 months (*LCC V3*) or 4.5 months (*LCC LX*)).
- Always use the type of battery specified for the LCC model.
- Replace the battery with the device PAY CASHLESS switched on to prevent spikes*[1] when replacing the battery.

15.3.2 Replacing the battery

Fig. 38: Replacing the battery at the LCC

Device switched on.

1. Use a pair of tweezers to remove the old battery from the battery compartment of the LCC.
2. Insert the new battery as follows:

   The positive terminal (+) faces the side of the LCC displaying a “Q”. (The figure shows the usual installation direction of the LCC in devices of the ABACUS system.)

[25] LCC operation without a battery or with a flat battery as well as spikes when replacing the battery may result in an invalid BIOS configuration at the LCC: If an invalid BIOS configuration occurs, rebooting of the LCC after voltage interruption can take up to 15 minutes (BIOS configuration is restored using standard settings).

16 Module I/O Interface Midi-P-USI (12 I/O) (optional)

Functioning

The module *I/O interface* is optionally used at the device PAY CASHLESS. The I/O Interface is serially connected to the TCC/SBC and provides digital inputs and outputs for communication between the TCC/SBC and functional units in the device or a connected barrier gate (parallel connection).

16.2 Design and operation

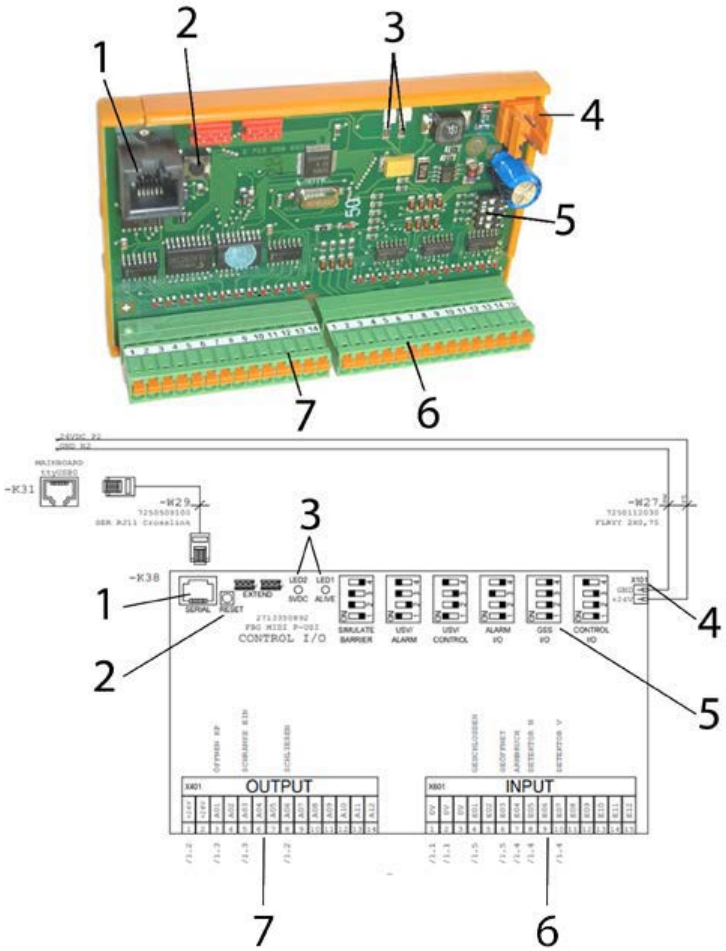

Fig. 39: I/O interface Midi-P-USI (here I/O interface assignment of an entrance control terminal)

1 Serial connection
2 Reset button
3 LED power supply
4 24 V power supply
5 Function DIP switch
6 Inputs E1-E12
7 Outputs A1-A12

Serial connection

The TCC/SBC is connected via the *serial connection*.

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Reset button

Use the *Reset button* to reset (restart) the program runs of the I/O interface Midi-P-USI).

LED power supply

The two *LEDs power supply* display the correct power supply for the I/O interface Midi-P-USI.

Continuously lit LED 5 V (on the left in figure): Logic power supply OK

Continuously lit LED 24 V (on the right in figure): Operating power supply OK

24 V power supply

The I/O interface Midi-P-USI is supplied with 24 V DC via the *24 V power supply*.

Function DIP switch

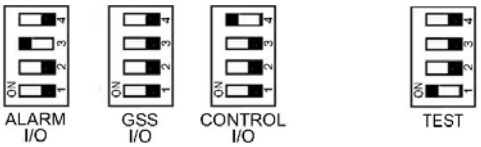

Fig. 40: DIP switch positions

The function with which the I/O interface Midi-P-USI is used at the device PAY CASHLESS is set at the *function DIP switch*:

Control I/O — Communication between the TCC/SBC and the functional units in the device

Alarm I/O — The same as *Control I/O*, but with a different configuration of contact E03 and A12.

GSS I/O — Communication between the display and buttons (for optional *TFT display*)

Test mode — The same as *I/O interface 16 I/O (see Technical Service Instructions I/O Interface 16 I/O)*.

⇨ Press the *Reset button* to accept modified DIP switch positions.

Inputs E1-E12

The I/O interface Midi-P-USI has twelve *inputs E1-E12.*

The inputs switch low active.

(The plug of the inputs is equipped with 13 pins to ensure correct insertion.)

Outputs A1-A12

The I/O interface Midi-P-USI has twelve *outputs A1-A12.*

(Not short circuit-proof, up to max. 100mA per circuit, total circuit maximum for all outputs: 300mA).

16.3 Assignment of contacts

The inputs and outputs are assigned as follows depending on the function in the device:

I/O interface installed as “Control I/O” or “GSS I/O”

Name of inputs + outputs / Plug position		Assignment of contacts if installed as	
	Midi-P-USI	**Control I/O**	**GSS I/O[26]**
Inputs (low active)	E01 / 4	Free	Ticket request
	E02 / 5	Receipt request	Cancel
	E03 / 6	Device door	Receipt request
	E04 / 7	Coin processing unit (MVE) door	Language toggle
	E05 / 8	Banknote cassette	Payment confirmation
	E06 / 9	Cancel	Lost ticket
	E07 / 10	Coin cassette	Ticket shortage
	E08 / 11	Lost ticket	Door switch
	E09 / 12	Issue debit card	Free
	E10 / 13	Language toggle	Free
	E11 / 14	Ticket shortage	Free
	E12 / 15	UPS (Battery low)	Free
Outputs (0V switching)	A01 / 3	MVE coin shortage	(Arrow) Ticket request/ Multicon
	A02 / 4	Door opener	Illumination dispensing tray
	A03 / 5	Free	(Arrow) Coin slot
	A04 / 6	Paper shortage printer	(Arrow) Banknote reader
	A05 / 7	Coin cassette full	(Arrow) SmartCard
	A06 / 8	Banknote cassette full	(Illuminated button) Cancel
	A07 / 9	Free	(Illuminated button) Receipt
	A08 / 10	Device in operation	Free
	A09 / 11	Free	Free
	A10 / 12	EasyMove out of service	Free
	A11 / 13	Free	Free
	A12 / 14	Alarm siren (Alarm I/O)	Free

I/O interface installed as “Alarm I/O“

If the I/O interface is installed as “Alarm I/O”, a signal output is immediately set to *Alarm siren* (A12) when the signal input *Device door* (E03) occurs. This alarm is triggered without a control via the **TCC**.

The function card 12 *APS-Alarm ON/ OFF* is then used to authorize device access prior to opening the device door and to switch off the alarm .

[26] Devices with TFT display: GSS I/O replaces the I/O functionality of the LC display controller

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17 Module Multicon MC 120

> **i** The description of the Multicon below as DESIGNA system module includes its complete functions for all devices. Information about specific functions or variants which are only available for certain devices is referred to separately.

17.1 Functioning

The Multicon MC 120 is used to process tickets and cards and can be equipped with magnetic stripe and/ or barcode technology. Depending on the device and the applied technology, various equipment levels are possible.

17.2 Design and operation

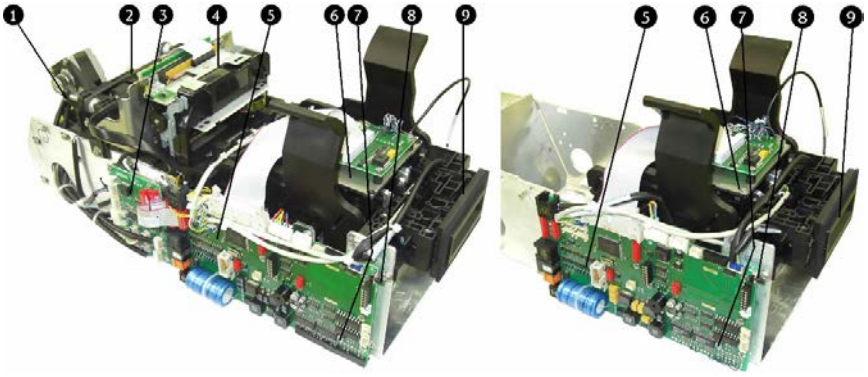


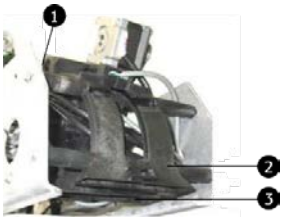
Fig. 41: Multicon with magnetic stripe technology (example for equipment at INT (left) and OUT (right))

1 Feeding unit and rear parking position
2 Self-sharpening cutter
3 PCB MC 120 paper feeder + cutter
4 Ticket printer (here: dot matrix printer in magnetic stripe system)
5 PCB MC 120 mainboard
6 Write(/read) unit (here: in magnetic stripe system)
7 Reset button
8 Test ticket button
9 Multicon insertion slot

Not shown:

10 Bottom ticket draw-in (paper tickets)

Feeding unit and rear parking position



1 Rear parking position
2 Feeding channel I
3 Feeding channel II

Fig. 42: Feeding unit and rear parking position

Rear parking position (feeding channel I blocked)

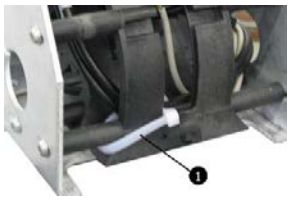


Fig. 43: Feeding channel I blocked

Paper tickets or plastic cards are “parked” in the *rear parking position* ❶ while processing other types of cards, e.g. payment processes with debit cards or credit cards or when processing **value checks**.

Feeding channel I ❷ cannot be used in case the parking position is used at the device, and is thus blocked.

> ℹ If a *rear parking position* is desired (e.g. credit card or value check processing), do not remove the block ❶ at *feeding channel I* and refrain from using it.

Feeding channel I and feeding channel II

Fig. 44: Feeding gap MPS

The *feeding channels I+II* enable ticket feeding from a belt: Paper tickets are fed from one or two[27] ticket magazines to the *write(/read) unit.*

When using options (e.g. *rear parking position* (see above)), the entire *feeding channel I* should not be used and is thus blocked.

MPS 120: If necessary, *feeding gap MPS* ❶ at *feeding channel I* is used if the option “Ticket feeding from belt” is desired and carried out at the back of the housing).

Self-sharpening cutter

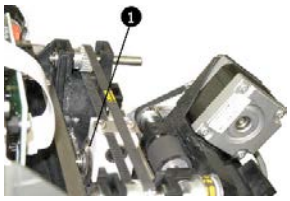


Fig. 45: Self-sharpening cutter

The *self-sharpening cutter* ❶ enables the cutting of paper tickets from a belt.

Due to its mechanical features the cutter is self-sharpening and maintenance free.

FBG MC 120 Paper feeder + Cutter

The actions of the feeding unit and cutter are controlled via the *PCB MC 120 paper feeder + cutter*. The *PCB MC 120 paper feeder + cutter* is connected to the *PCB MC 120 mainboard* via a flat conductor cable and receives all the necessary control signals from here.

Ticket printer

A dot matrix printer ***or*** a thermal printer can be used for magnetic stripe technology; barcode technology only allows the application of a thermal printer.

The printed circuit board of the ticket printer (*PCB ticket printer)* is connected to the *PCB MC 120 mainboard* and receives all the necessary control signals from here.

Dot matrix printer (only magnetic stripe technology)

Fig. 46: Dot matrix printer

The dot matrix printer prints the paper tickets in plain text with digits from 0-9 and capital letters on several lines.

The number of characters per line is limited to 28.

[27] Only ENT 120 and IN 1307: For information on *double ticket magazine* also see the section *Device Description/ Ticket magazine holder*).

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Thermal printer

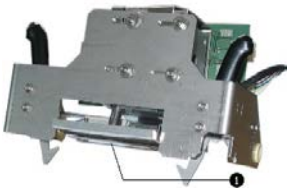

Fig. 47: Thermal printer

A thermal printer can also be used in magnetic stripe systems to utilize additional options for ticket printing (e.g. graphical presentation).

In a barcode system, a thermal printer is always used at the Multicon of the ENT 120 and APS 120 to print barcodes for ticket processing (as well as additional ticket information, if required).

The thermal printer uses thermal printing technology to print paper tickets. The number of characters per line is limited to 28. Paper tickets with an “interleaved 2 of 5” barcode are printed.

NOTICE

Always handle the thermal printer with care to prevent damages to the delicate *thermal print head* ❶.

PCB MC 120 mainboard

The magnetic track reader is equipped with a printed circuit board (*PCB MC 120 mainboard*) which has serial communication with the **TCC/SBC** and takes control of the processes.

The *PCB MC 120 mainboard* connection assignment is described in the separate instructions *PCB MC 120 mainboard*.

Write(/read) unit

The *write(/read) unit* at the Multicon depends on the applied technology:

Barcode and magnetic stripe technology can be used simultaneously at a Multicon, e.g. to ensure credit card processing in a barcode system.

Magnetic stripe technology

The *write(/read) unit* is equipped for magnetic stripe technology with side or middle write/ read heads. The data of the tickets and cards is read and, if necessary, written (coded).

The *write(/read) unit* draws in tickets and cards, or these are inserted from a ticket stripe: Depending on the **configuration** and the device, the ticket is subsequently either issued or drawn into a collecting box.

As standard, paper tickets as well as plastic cards with a side stripe and optionally also with a middle stripe can be processed (depending on the installed read/ write heads). Furthermore, discount stripes can be used in combination with middle or side stripes; these are then wide magnetic stripes (12 mm).

In order to prevent swindling (insertion of 2 tickets), new tickets are only written on from below (e.g. ticket issue at ENT 120 or **producing** of cards). Therefore, it is essential to pay attention to the position of the magnetic stripe when loading a ticket stripe at ticket issuing devices *(see chapter 17.3.2 Insert new ticket belt on page 103)*.

Barcode technology

Fig. 48: Barcode card reader

The *write(/read) unit* is equipped with a *barcode card reader* ❶ for barcode technology. The ticket and card data is only read here.

Tickets and cards are inserted from the front or rear for processing. Depending on the **configuration** and the device, the tickets and cards are subsequently returned or drawn into a collecting box (see *bottom ticket draw-in*).

Paper tickets and plastic cards with barcodes (type “Interleaved 2 of 5”) can be read.

If magnetic stripe processing is also desired (e.g. credit card processing), additional write/ read heads are used: This provides the same options as for pure magnetic stripe technology.

Clamp attachment

Fig. 49: Clamp attachment

The write(/read) unit is equipped with a *clamp attachment* ❶ which can be easily removed and replaced, e.g. when cleaning *(see chapter 17.4.3 Cleaning the ticket transport routes, write (/read) unit, cutter and ticket printer on page 107)*.

Reset button

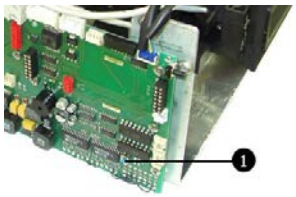

Fig. 50: Reset button

The *reset button* ❶ at the *PCB MC 120 mainboard* triggers a reset at the Multicon: Tickets are moved through the Multicon and ejected at the *Multicon insertion slot*.

The *reset button* is also used to execute a program download if a laptop is connected and/ or to read the counter readings and version no. *(see separate instructions PCB MC 120 mainboard)*.

Test ticket button

Fig. 51: Test ticket button

A “test ticket” is created at the Multicon via the *test ticket button* ❶.
The test ticket allows the ticket imprint as well as the ticket cutting position to be checked).

The test ticket button is also used to adjust the ticket cutting position *(see chapter 17.4.4 Check ticket imprint on page 108)*.

Multicon insertion slot

The tickets and cards are fed into the *write(/read) unit* or returned to the customers via the *Multicon insertion slot*.

Bottom ticket draw-in (paper tickets)

Paper tickets can be drawn into a collecting box from the *bottom ticket draw-in,* e.g. value checks.

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17.3 Filling and emptying services for the Multicon MC 120

17.3.1 Safety

Electric voltage

⚠ DANGER

Danger of death due to electric shock.

Filling and emptying is carried out with the device switched on.

When the device is switched on, the main power voltage (120V) is applied to the following components: the power distribution box, the terminal block -X0, the power supply unit and to the optional heater and thermostat and, if necessary, to further optional components *(see chapter Device Description)*.

Contact with live components may result in death.

– Only specially instructed **shift managers** are allowed to carry out certain maintenance and filling work ***inside*** the device.

17.3.2 Insert new ticket belt

Device switched on.

1. Make sure that the ticket magazine is placed with the magazine's underside recess on the roller scanner of the *ticket magazine holder*. This is the only way that the roller scanner can check the ticket storage and send a signal to the **TCC/SBC** if there is a shortage[28].
2. Insert the ticket belt as follows:

Magnetic side stripe	Magnetic central stripe	Barcode
Magnetic stripe at the bottom	Magnetic stripe at the bottom	Unprinted, thermal coated ticket surface at the top
	Fig. 52: Insert new ticket belt	

3. Insert the first ticket from the rear into *feeding channel I* or *II*.[29]

➤ The ticket is automatically positioned once it reaches the light barrier.

[28] Only entrance control terminal

[29] Here: Insertion at *feeding channel I* (IN).
If a *rear parking position* is used (e.g. credit cards or value check processing at the PAY), *feeding channel I* is blocked:
Do not remove the block and use *feeding channel II* instead.

4. Press the *test ticket button*.
➤ The first ticket is now fed through the Multicon and issued as a “test ticket”.
5. Check the cutting position and print image.

17.4 Maintenance services for the Multicon MC 120

17.4.1 Safety

Electric voltage

⚠ DANGER

Danger of death due to electric shock!

When the device is switched on, the main power voltage (120V) is applied to the following components: Power distribution box, terminal block -X0, power supply unit and to the optional heater and thermostat and, if necessary, to further optional components *(see chapter Device Description)*.

- Only specially instructed **shift managers** are allowed to carry out certain maintenance and filling work ***inside*** the device.
- Switch off the device *(see chapter 5.3.4 Power distribution box on page 35)* unless the work step requires a voltage supply.
- Be aware that the terminal block -X0 and the power distribution box remain energized (120V) even when the automatic circuit breakers are switched off.

Inappropriate cleaning

⚠ WARNING

Risk of injury from inappropriate cleaning!

Inappropriate cleaning can cause severe or lethal injuries.

- Only trained **shift managers** are allowed to carry out cleaning ***inside*** the device as indicated and described in this chapter.
- If any other servicing is needed, please contact your Designa electrical technicians or electrical technicians of Designa trained and authorized dealers and partners. (For contact: see the beginning of this operating manual).
- Make sure that cleaning fluids are neither swallowed nor come into contact with eyes.

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Hazardous laser radiation

⚠ WARNING

Risk of injury due to laser radiation!

Laser radiation can cause permanent eye damage.

The (write/)read unit of the Multicon for barcode technology is equipped with a barcode scanner.

Class 2 laser product: The accessible laser radiation is not considered hazardous when used for a short period of exposure (up to 0.25 s).

- Do not stare into the laser beam.
- Work at the barcode scanner should only be carried out by specially instructed **shift managers**.
- If a power supply is required, the respective tasks at the barcode scanner should only be carried out by Designa electrical technicians or electrical technicians of Designa trained and authorized dealers and partners.

Hazardous optical radiation

⚠ WARNING

Risk of injury due to optical radiation!

The Multicon is equipped with light barriers with optical radiation (infrared (IR-A)).

Optical radiation can cause permanent eye damage.

- Do not stare into the beam.
- Work at the light barriers should only be carried out by specially instructed **shift managers**.
- If a power supply is required, the respective tasks at the light barriers should only be carried out by Designa electrical technicians or electrical technicians of Designa trained and authorized dealers and partners.

Inappropriate cleaning with air pistols

⚠ CAUTION

Risk of injury due to inappropriate cleaning with air pistols!

Inappropriate cleaning with air pistols may result in minor injuries or damage to eyes due to flying particles.

- Always wear safety goggles.
- Prevent air penetrating the body through skin injuries.
- Do not aim air pistols at people.
- Only use air pistols with a maximum pressure of 50.8 psi (3.5 bar).
- Only use air pistols with a reduced noise level (multi-hole nozzles).

Inappropriate cleaning

NOTICE

Inappropriate cleaning can result in damage of the Multicon.

- Always keep the Multicon MC 120 very clean. A clean Multicon MC 120 is better protected against faults.
- When cleaning with compressed air, always make sure the jet of air from the nozzle is ***not*** aimed directly inside the device.
- Do not use thinners or any liquids when cleaning.
- Recommended cleanser:
  - DESIGNA cleaning tickets
  - dry microfiber cloth
  - Special, dry microfiber cloth for cleaning delicate surfaces.

17.4.2 Cleaning the ticket transport routes and (write-/) read unit with DESIGNA cleaning card

Device switched on.

1. At first, remove the ticket belts from the *feeding unit* at the rear of the Multicon.
2. Press the *test ticket* button and the *reset button* simultaneously.
3. Release the *reset button* and keep the *test ticket button* pressed until an acoustic signal sounds.

➤ The Multicon is now in its cleaning mode:
A permanent ticket transport is activated into the issuing direction (from the rear to the front). The light barriers are not active as no ticket positioning is needed.

4. Insert the cleaning ticket into the *feeding unit* at the rear and remove it from the *insertion slot* in the front after it has been transported through the Multicon. (Multicon without *feeding unit* (e.g. OUT):
Insert the cleaning ticket directly into the write (/read) unit from the rear.
5. Repeat this several times using both sides of the cleaning ticket and both *feeding channels* (if two feeding channels are available).
(The feeding channels are in an alternating acceptance mode. 1 sec. each.)

➤ The cleaning function stops automatically after 1 minute or can be stopped by pressing the *reset button*.

➤ The Multicon is now back in its normal operating mode.

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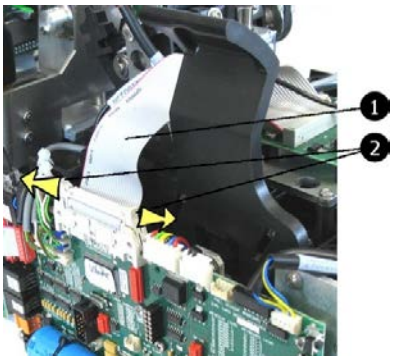
17.4.3 Cleaning the ticket transport routes, write (/read) unit, cutter and ticket printer

1. Switch off the device.
2. If necessary, pull out the retainer with the Multicon.



1 Flat cable
2 Retainers

Fig. 53: Disconnecting the flat cable

3. Disconnect the *flat cable* and the *earthing cable* of the write(/read) unit.
4. Move the *retainers* to the side and disconnect the *flat cable* from the top.
5. The *earthing cable* is now accessible and should also be disconnected.
6. Now squeeze the prongs of the *clamp attachment* together and remove it from the top.
7. Flip up the dot-matrix printer or thermal printer.
8. At first, clean the ticket transport route and the components of the *write(/read) unit* (top and bottom) with compressed air.

   When cleaning with compressed air, always make sure that the jet of the compressed air nozzle is not directed into the interior of the device.
9. Regularly remove paper snippets and fluff from the area around the self-sharpening cutter with compressed air.
10. Clean the transport rollers of the *write(/read) unit* (top and bottom) with a dry microfiber cloth.
11. Clean the read heads of the (read/write) unit (top and bottom) and/or the barcode glass plate with a dry microfibre cloth.
12. Replace the *clamp attachment* onto the *write(/read) unit.*
13. Re-connect the *earthing cable* and the *flat cable*.
    Allow the *retainers* to engage with the *flat cable*.
14. Clean the wire print head or thermal print head with a dry microfiber cloth.
15. Fold the dot matrix printer back to its original position or fold the thermal printer back, press the fixing clamps together and carefully place the thermal printer in its position.
16. Switch on the device.

17.4.4 Check ticket imprint

Device switched on.

1. Press the *test ticket button* once:
   A test ticket is produced.
2. Check that a clean, clear and regular print image is available for the ticket imprint.

Dot matrix printer

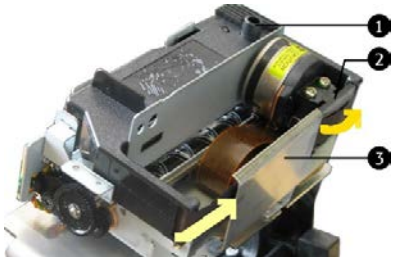
3. If you discover problems despite cleaning, change the ribbon cartridge of the dot matrix printer.

Thermal printer

4. If the print image remains inadequate after cleaning, please contact your DESIGNA service. The thermal printer can be readjusted and set by your DESIGNA service department.

Change ticket printer ribbon cartridge

1. Switch off the device.
2. Pull the ticket printer upwards.
3. Lift and remove the used ribbon cartridge.
4. Insert the new ribbon cartridge.



1 Turning knob
2 Print head
3 Guiding plate

Fig. 54: Place the ribbon cartridge

5. Feed the ribbon in a way that it is guided between the *print head* and the *guiding plate.*
   The ribbon cartridge has to lock into its place in the ticket printer.
6. Tense the ribbon via the *turning knob*.
7. Put the ticket printer back to its original position.
8. Switch on the device.

17.4.5 Checking and adjusting the ticket cutting position

Device switched on.

1. Press the *test ticket button* once:
   A test ticket is produced.
2. Check whether the connecting bars between the tickets are being cut in the middle.

   The cutting position should be exactly between the tickets in the middle of the two connecting bars. This reduces the amount of rest paper and the workload of the cutting blade.

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3. Adjust the ticket cutting position if the tickets are not cut in the middle.

Adjusting the ticket cutting position

Device switched on.

1. Press the *test ticket button for approx*. 4 sec. until a signal (1x short) sounds.
2. Subsequently release the button:

➤ Four 4 test tickets from strip are created, cut and measured. The test tickets are purposely cut too long during the adjustment process. Once the process has been completed a signal sounds (2x short): The new cutting position has been accepted.

3. Now press the *test ticket button* once and check the new cutting position. Repeat the process, if necessary.

Resetting the cutting position to factory setting

1. Press the test ticket button for approx. 4 sec. until a signal (1x short) sounds.
2. Do not subsequently release the button, but keep it pressed for a further 4 sec.

➤ Once the process has been completed a signal sounds (irregular): The factory setting has been reset.

17.4.6 Checking all connecting cables are inserted correctly

1. Switch off the device.
2. Check that all connecting cables are inserted correctly.
3. Switch on the device.

17.4.7 Checking the correct position of the Multicon insertion slot

1. Check correct position of the Multicon insertion slot.

   This should be flush with the front panel or protrude only slightly (approx. 1mm), so that tickets and cards are only inserted into the insertion slot during operation.
2. Switch off the device.
3. If necessary, readjust the insertion slot:
   Unscrew the knurled screws which hold the Multicon in place on the mounting plate and displace it slightly.
4. Slightly retighten the knurled screws, close the door of the device and check whether the installation position is correct.
5. Retighten the knurled screws if the position is correct.
6. Switch on the device.

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17.5 Error analysis

Automatic routines

The following routines are automatically carried out when the Multicon is switched on (power supply) or if a reset is carried out with the r*eset button*:

- The *Live LED (see Fig. below)* on the *PCB MC 120 Mainboard* flashes permanently (if there is no error)
- Single initializing of the printer
- The ticket channel is being emptied
- An acoustic signal sounds, 2x short

⇨ Check these routines if incorrect operation occurs.

If an error occurs, an acoustic signal sounds (4x long), there is a subsequent pause and an error code is displayed via an acoustic signal:

1x acoustic signal	Cutter does not return to the idle position
2x acoustic signal	Printer faulty
3x acoustic signal	Ticket still in the device or jammed at the feeding unit

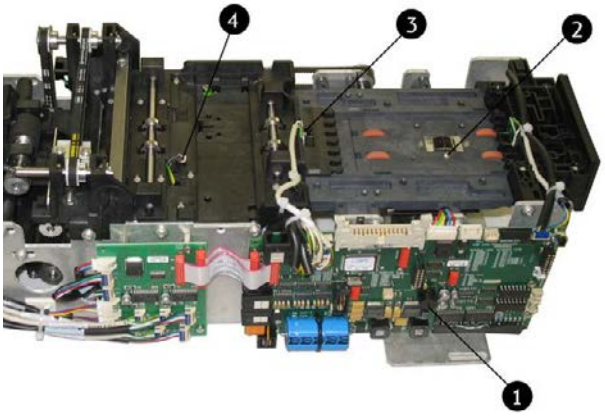

Fig. 55: Live LED and light barrier for error analysis

After 3x acoustic signal (“ticket jammed”) a further error code then occurs with a different acoustic signal to define the error (version V56 and higher):

1x acoustic signal	*Light barrier Magnetic head* occupied or defective
2x acoustic signal	*Light barrier Center* occupied or defective
3x acoustic signal	*Light barrier Printer* occupied or defective
4x acoustic signal	Ticket feed: Ticket belt cannot be cut
5x acoustic signal	Parked ticket issuing not possible

17.6 Troubleshooting

Inappropriate troubleshooting

NOTICE

Inappropriate troubleshooting can result in damage of the device.

- Always observe the following simple troubleshooting measures.
- Simple troubleshooting measures are listed below.
  Complex measures should only be carried out by trained specialized staff or by your DESIGNA service.

Error	Possible causes	Possible measures
LED at the *PCB MC 120 mainboard* does not light up	Operating state has not been achieved	Check correct connection of the power supply to the Multicon and *PCB MC 120 mainboard*
	PCB MC 120 mainboard disturbed/ defective	Disconnect and reconnect power supply
MC 120 or *ticket printer* initialize outside the automatic routines	One or several components are blocked	Check smoothness and freedom of operation of the *ticket printer*
	Connection cable is not connected (correctly)	Check correct insertion of the connection cable and, if necessary, insert it correctly
	Trapped tickets?	Check transport route of the ticket
Cutter is running after switching on	*PCB MC 120 mainboard* or *PCB MC 120 paper feeder + cutter* disturbed/ defective	Disconnect and reconnect power supply *PCB MC 120 mainboard* or *PCB MC 120 paper feeder + cutter*
	Connection cable is not connected (correctly)	Check correct insertion of the connection cable and, if necessary, insert correctly
Message ticket incorrect at device display	Magnetic information on the ticket is incorrect	Check magnetic information on another Multicon Recode and reinsert ticket Test the previously used Multicon
	Transport not in the correct reading position	Check the ticket's transport route and, if necessary, clean it Check the cleanliness of the transport rollers and, if necessary, clean them
	Correct insertion direction observed (side stripe)?)	Observe the insertion direction
Trapped tickets	Foreign matter	Check *write(/read) unit* for foreign matter and, if necessary, clean it Check the ticket's transport route and, if necessary, clean it Check the cleanliness of the transport rollers and, if necessary, clean them
	Rough-running cutter	Check the cleanliness of the cutter and, if necessary, clean it

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	Rough running MC 120 motor	Check the cleanliness of the transport belts and transport -wheels and, if necessary, clean them

18 Multicon MC Barcode Module

> **i** The description of the Multicon MC Barcode below as DESIGNA system module includes its complete functions for all devices.
> Information about specific functions or variants which are only available for certain devices is referred to separately.

18.1 Functioning

The Multicon MC Barcode is used to process barcode tickets and cards. Depending on the device and the desired functions, various equipment levels are possible.

18.2 Design and operation

Example for equipment at the entry control terminal

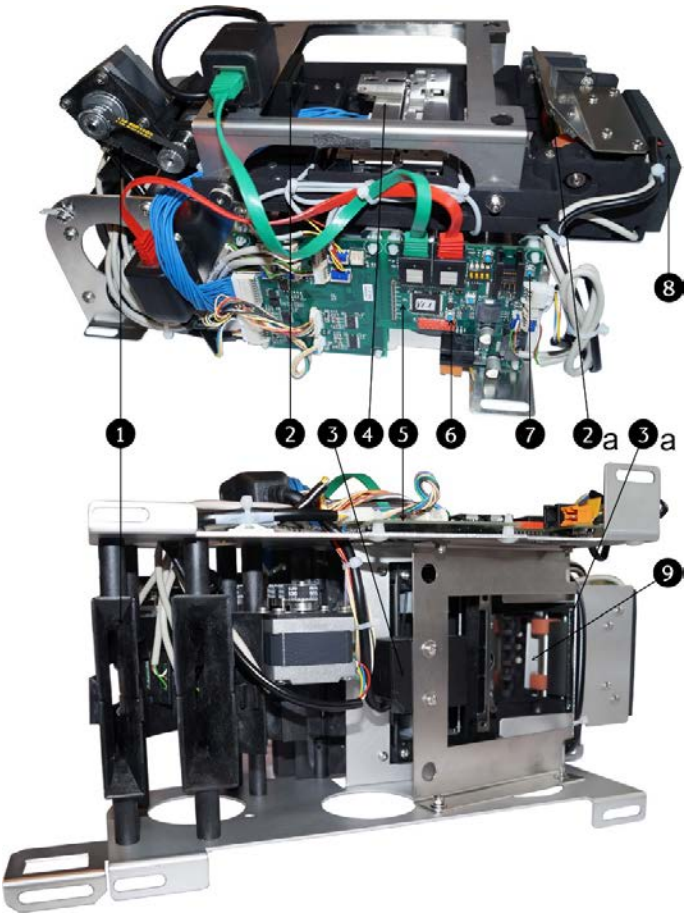

Fig. 56: Multicon MC Barcode, example for equipment at the entry control terminal

1 Feeding unit (here a feeding unit with two feeding channels, optional)
2 Barcode card reader with mirror (2a)
3 Barcode card reader with mirror (3a) (optional)
4 Ticket printer incl. cutter

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5 PCB MC Barcode Mainboard
6 Reset button
7 Test ticket-button
8 Illuminated insertion slot
9 Bottom ticket draw-in (paper tickets, optional)

Feeding unit

Fig. 57: Double feeding unit (optional)

The Multicon MC Barcode can be equipped with either a single or a double feeding unit.

When using the single feeding unit, paper tickets are fed from a belt through a single feeding unit at the ticket printer.

The *feeding channels I* ❶*+II* ❷ enable ticket feeding from a belt:
Up to 2x 5,000 paper tickets are fed from two ticket magazines.

Barcode card reader

Fig. 58: Barcode card reader

The Multicon MC Barcode is fitted with a barcode card reader with CCD technology as standard. In this case, the barcode is read from the top.

To be able to read barcode tickets and cards from all four directions, the Multicon MC Barcode can be additionally equipped with a barcode card reader.

The ticket and card data is only read here (not written (coded)).

DESIGNA paper tickets and plastic cards with barcodes can be read.

Ticket printer incl. cutter

Fig. 59: Ticket printer incl. cutter

The ticket printer prints the paper tickets with a barcode using a thermal printing process.

Paper tickets are only printed after being fed to the ticket printer either via the single feeding unit at the ticket printer or the double feeding unit. Paper tickets fed via the illuminated insertion slot are not printed.

The *cutter* ❷ ensures the paper tickets are cut from the belt.

PCB MC Barcode Mainboard

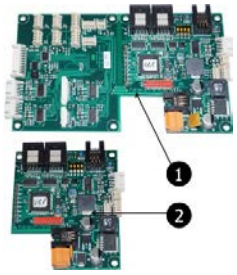

Fig. 60: PCB MC Barcode Mainboard

The Multicon MC Barcode is equipped with a printed circuit board (*PCB MC Barcode mainboard*) which has serial communication with the **TCC/SBC** and takes control of the processes.

Two versions of the PCB mainboard are available: PCB MC Barcode mainboard for devices with a ticket printer ❶ and without a ticket printer ❷.

> **i** The *PCB MC Barcode mainboard* connection assignment is described in the separate instructions *PCB MC Barcode mainboard*.

Reset button

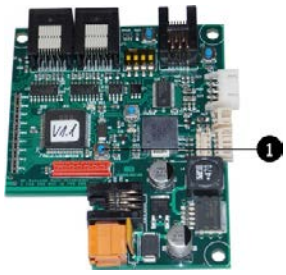

Fig. 61: Reset button

The *reset button* ❶ at the *PCB MC Barcode mainboard* triggers a reset at the Multicon: Tickets are moved through the Multicon and ejected at the *illuminated insertion slot*.

The *reset button* is also used to execute a program download if a laptop is connected and/ or to read the counter readings and version no. *(see separate instructions PCB MC Barcode mainboard)*.

Test ticket button

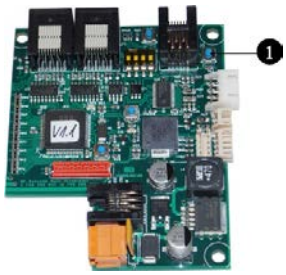

Fig. 62: Test ticket button

A test ticket is created at the Multicon via the *test ticket button* ❶. The test ticket allows the ticket imprint to be checked *(see chapter 18.3.2 Insert new ticket belt on page 117)*.

Illuminated insertion slot

The tickets and cards are fed into the *Multicon MC Barcode* or returned to the customers via the *illuminated insertion slot*.

Bottom ticket draw-in (paper tickets, optional)

Paper tickets can be drawn into a collecting box from the *bottom ticket draw-in.*

18.3 Filling and emptying services for the Multicon MC Barcode

18.3.1 Safety

Electric voltage

⚠ DANGER

Danger of death due to electric shock.

Filling and emptying is carried out with the device switched on.

When the device is switched on, the main power voltage (120V) is applied to the following components: the power distribution box, the terminal block -X0, the power supply unit and to the optional heater and thermostat and, if necessary, to further optional components *(see chapter Device Description)*.

Contact with live components may result in death.

– Only specially instructed **shift managers** are allowed to carry out certain maintenance and filling work ***inside*** the device.

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18.3.2 Insert new ticket belt

Entrance Control Terminal and Automatic Pay Station

Device switched on.

1. Make sure that the ticket magazine is placed with the magazine's underside recess on the roller scanner of the ticket magazine holder. This is the only way that the roller scanner can check the ticket storage and send a signal to the **TCC/SBC** if there is a shortage[30].
2. Insert the ticket belt as follows:

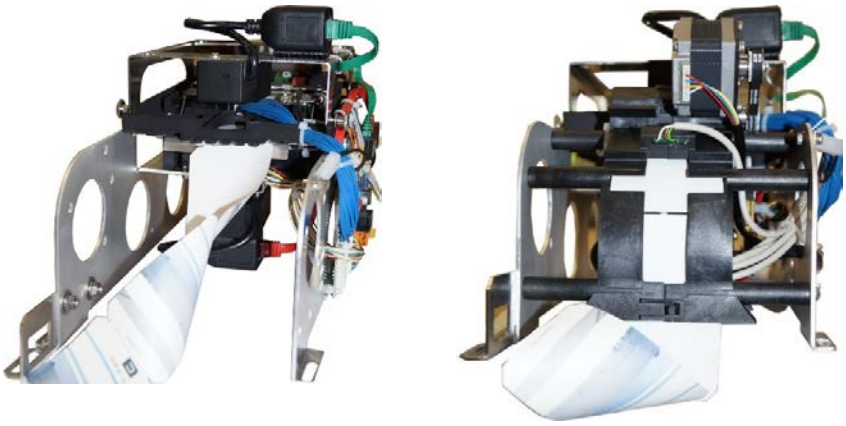

Fig. 63: Multicon MC Barcode: Without double feeding unit (left), with double feeding unit (right)

3. Feed the first ticket from the rear into the thermal printer or into the feeding channel I or II. The unprinted, thermal coated ticket surface must always face upwards.

➤ The ticket is automatically positioned once it reaches the light barrier.

4. Press the test ticket button.

➤ The first ticket is now fed through the Multicon MC Barcode and issued as a test ticket.

5. Check the print image.

Manual Pay Station

Device switched on.

1. Feed the first ticket to the Multicon from the rear through the opening for ticket feeding from a belt. The unprinted, thermal coated ticket surface must always face upwards.

➤ The ticket is automatically positioned once it reaches the light barrier.

[30] Only Entrance Control Terminal

18.4 Maintenance services for the Multicon MC Barcode

18.4.1 Safety

Electric voltage

⚠ DANGER

Danger of death due to electric shock!

When the device is switched on, the main power voltage (120V) is applied to the following components: Power distribution box, terminal block -X0, power supply unit and to the optional heater and thermostat and, if necessary, to further optional components *(see chapter Device Description)*.

- Only specially instructed **shift managers** are allowed to carry out certain maintenance and filling work ***inside*** the device.
- Switch off the device *(see chapter 5.3.4 Power distribution box on page 35)* unless the work step requires a voltage supply.
- Be aware that the terminal block -X0 and the power distribution box remain energized (120V) even when the automatic circuit breakers are switched off.

Inappropriate cleaning

⚠ WARNING

Risk of injury from inappropriate cleaning!

Inappropriate cleaning can cause severe or lethal injuries.

- Only trained **shift managers** are allowed to carry out cleaning ***inside*** the device as indicated and described in this chapter.
- If any other servicing is needed, please contact your Designa electrical technicians or electrical technicians of Designa trained and authorized dealers and partners. (For contact: see the beginning of this operating manual).
- Make sure that cleaning fluids are neither swallowed nor come into contact with eyes.

Hazardous optical radiation

⚠ WARNING

Risk of injury due to optical radiation!

The Multicon is equipped with light barriers with optical radiation (infrared (IR-A)).

Optical radiation can cause permanent eye damage.

- Do not stare into the beam.
- Work at the light barriers should only be carried out by specially instructed **shift managers**.
- If a power supply is required, the respective tasks at the light barriers should only be carried out by Designa electrical technicians or electrical technicians of Designa trained and authorized dealers and partners.

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Inappropriate cleaning with air pistols

⚠ CAUTION

Risk of injury due to inappropriate cleaning with air pistols!

Inappropriate cleaning with air pistols may result in minor injuries or damage to eyes due to flying particles.

- Always wear safety goggles.
- Prevent air penetrating the body through skin injuries.
- Do not aim air pistols at people.
- Only use air pistols with a maximum pressure of 50.8 psi (3.5 bar).
- Only use air pistols with a reduced noise level (multi-hole nozzles).

Inappropriate cleaning

NOTICE

Inappropriate cleaning can result in damage of the device.

- Always keep the Multicon MC Barcode very clean. A clean Multicon MC Barcode is better protected against faults.
- When cleaning with compressed air, always make sure the jet of air from the nozzle is ***not*** aimed directly inside the device.
- Do not use thinners or any liquids when cleaning.
- Recommended cleanser:
  - dry microfiber cloth
  - Special, dry microfiber cloth for cleaning delicate surfaces.

18.4.2 Cleaning Ticket Transport Routes, Barcode Card Reader, Ticket Printer incl. Cutter

1. Switch off the device.
2. If necessary, extract the pull-out with the Multicon.

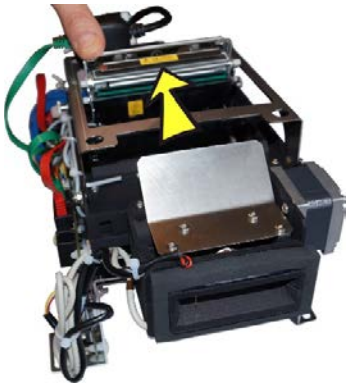

Fig. 64: Folding up the thermal line

3. Fold up the thermal line of the thermal printer.
4. Clean the ticket transport route, the ticket printer incl. cutter and the barcode card reader thoroughly with compressed air.
5. Use a dry microfiber cloth to clean the thermal line.
6. Return the thermal line to its initial position.
7. Use a dry microfiber cloth to clean the freely accessible transport rollers.
8. Use a dry microfiber cloth to clean the barcode glass panel and the mirror.
9. Switch on the device.

18.4.3 Checking all connecting cables are inserted correctly

1. Switch off the device.
2. Check that all connecting cables are inserted correctly.
3. Switch on the device.

18.4.4 Checking the correct position of the Multicon insertion slot

1. Check correct position of the Multicon insertion slot.

   This should be flush with the front panel or protrude only slightly (approx. 1mm), so that tickets and cards are only inserted into the insertion slot during operation.
2. Switch off the device.
3. If necessary, readjust the insertion slot:
   Unscrew the knurled screws which hold the Multicon in place on the mounting plate and displace it slightly.
4. Slightly retighten the knurled screws, close the door of the device and check whether the installation position is correct.
5. Retighten the knurled screws if the position is correct.
6. Switch on the device.

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18.5 Error analysis

Automatic self test

When switching on (power supply) the Multicon MC Barcode and when using the *reset button*, the device performs a self test:

- The ticket channel is being emptied
- An acoustic signal sounds, 1x short
- If necessary, a subsequent short acoustic signal in a different pitch indicates that the device has not yet been initialized. This does not impact functioning.

If an error occurs, an acoustic signal sounds (4x long), there is a subsequent pause and an error code is displayed via an acoustic signal:

1x acoustic signal	Cutter does not return to the idle position
2x acoustic signal	Printer not working correctly, at least one thermal element is defective. All 432 thermal elements of the thermal line are tested.
3x acoustic signal	Ticket still in the device or jammed at the feeding unit After 3x acoustic signal (“ticket jammed”) a further error code then occurs with a different acoustic signal to define the error.
1x acoustic signal	Light barrier in front of the printer occupied or defective

Example: Ticket jammed at front

- 4x acoustic signal (even tone)
- Pause
- 3x acoustic signal (even tone)
- Pause
- 1x acoustic signal (irregular tone)

19 Module Receipt Printer

Functioning

To be able to issue customers with a receipt of payment processes, a receipt printer is installed in ABACUS payment devices (automatic pay stations or at the exit with optional **drive&pay**).

Receipt printers at pay stations also issue receipts about the removal of the coin cassette or banknote cassette.

19.2 Design and operation

Basically, the receipt printers in all the ABACUS devices are designed as shown in the figure below. Even if the installation position or add-ons (e.g. weather protection) vary, functioning and operation of the elements stay the same.

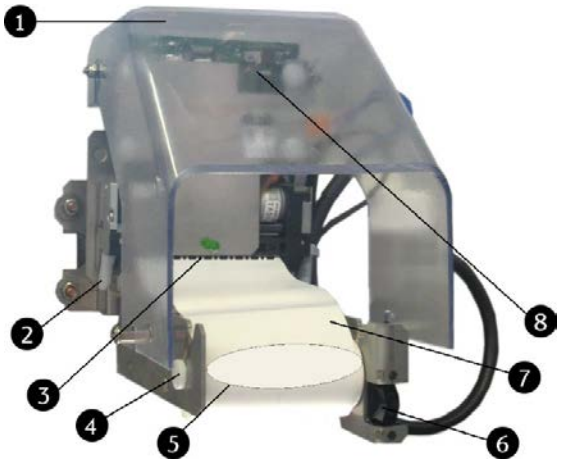

Fig. 65: Receipt printer

1 Weather protection
2 Opening handle (for draw-in device)
3 Draw-in device
4 Paper roll holder
5 Printable surface
6 Reflex light barrier
7 Paper roll
8 PCB receipt printer

Weather protection

The *weather protection protects* the receipt printer if the device is open (not available at Pay 1104).

Opening handle (for draw-in device)

It is possible to lift the print head of the thermal printer with the *opening handle* in order to, e.g., remove an old paper roll, to clean the paper guide with **compressed air** or to insert a new paper roll *(see chapter 19.4.2 Insert new paper roll on page 125)*.

Draw-in device

The paper roll is fed into the receipt printer via the *draw-in device* with the printable surface facing upwards.

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Paper roll holder

The paper roll is mounted onto the *paper roll holder*, which is loosely placed into the holding device.

Printable surface

The *printable surface* of thermal paper is easily recognizable as the paper changes color due to heat generation (e.g. by scratching the surface).

Reflex light barrier

Fig. 66: Reflex light barrier

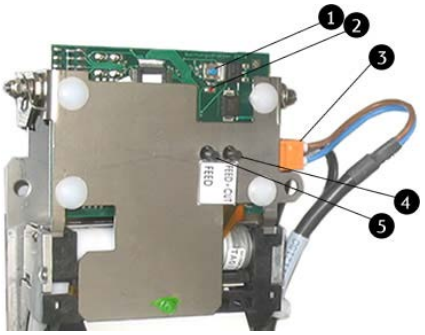
The r*eflex light barrier* ❶ on the *paper roll holder* registers a shortage of paper.
If the diameter of the inserted paper roll is below a certain size, a message is generated at the **TCC/SBC** and sent to the **System server**.

Paper roll

The following *paper roll* is suitable for the receipt printer and can be ordered:

	Automatic pay stations	**Exit control terminals**
DESIGNA Ident. no.	7 232 120 579	7 232 120 580
Paper width	2.24 in (57 mm)	2.24 in (57 mm)
Paper length	312 ft (95 m)	98 ft (30 m)
Paper strength	0.246 oz./ft^2 (75 g/m^2)	0.246 oz./ft^2 (75 g/m^2)

PCB receipt printer



1 Reset button
2 Operating LED
3 Power supply
4 FEED+CUT (Feed/ Cut-off button)
5 FEED (Feed button)
Not shown:
6 Serial connection

Fig. 67: PCB receipt printer

Reset button

Use the *reset button* to trigger the following functions:

Reset + FEED+CUT

Three sections are printed as test printout separated by partial cuts.

Reset + FEED

The version no. of the receipt printer software, the recent settings of the DIP switches, the recent character set and a test pattern are printed and issued as test printout. The paper stripe is cut.

Operating LED

The *operating LED* flashes when a 24V power supply is connected and the required program information has been loaded onto the controller of the *PCB receipt printer*.

Power supply

The receipt printer is supplied with 24V DC via the *power supply*.

FEED+CUT
(Feed/ Cut-off button)

The *FEED+CUT* button feeds approx. 6.5 cm of paper before cutting it off.

FEED
(Feed button)

The *FEED button* feeds the paper by one feed step if the button is pressed once. If the button is kept pressed the paper feeding occurs until the button is released

Serial connection

The receipt printer is connected to the **TCC/SBC** via the *serial connection*.

19.3 Optional receipt printer

When using certain options (e.g. PINPad, fiscal printers), a receipt printer designed for wider paper rolls can be installed at the device PAY CASHLESS. This receipt printer can print up to 40 characters per line.

The design and operation of the optional receipt printer basically correspond to those of the default receipt printer and are, therefore, not described separately.

Paper roll

The following *paper roll* is suitable for the optional receipt printer and can be ordered:

DESIGNA Ident. no.	7 232 120 581
Paper width	3.15 in (80 mm)
Paper length	197 ft (60 m)
Paper strength	0.246 oz./ft^2 (75 g/m^2)

19.4 Filling and emptying services for the receipt printer

19.4.1 Safety

Electric voltage

⚠ DANGER

Danger of death due to electric shock.

Filling and emptying is carried out with the device switched on.

When the device is switched on, the main power voltage (120V) is applied to the following components: the power distribution box, the terminal block -X0, the power supply unit and to the optional heater and thermostat and, if necessary, to further optional components *(see chapter Device Description)*.

Contact with live components may result in death.

– Only specially instructed **shift managers** are allowed to carry out certain maintenance and filling work ***inside*** the device.

Hot surface

⚠ CAUTION

Danger of burns!

The surface of the print head and motor may become hot during operation.

Contact with the surface may result in burns.

– Do not touch the print head or motor.

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19.4.2 Insert new paper roll

NOTICE

Only use the specified thermal paper to ensure a long service life and an excellent printout.

Suitable thermal paper can be ordered from DESIGNA. Lower quality paper can cause inferior printouts, abrasion of the print head and paper jams.

Device switched on.

1. Loosen the print head from the old paper roll by releasing the *opening handle*.

➤ The old paper roll can now be removed.

2. Remove the *paper roll holder* and the old paper roll and place a new paper roll on the holder.
3. Reinsert the *paper roll holder.*
4. Feed the paper into the draw-in device as follows:

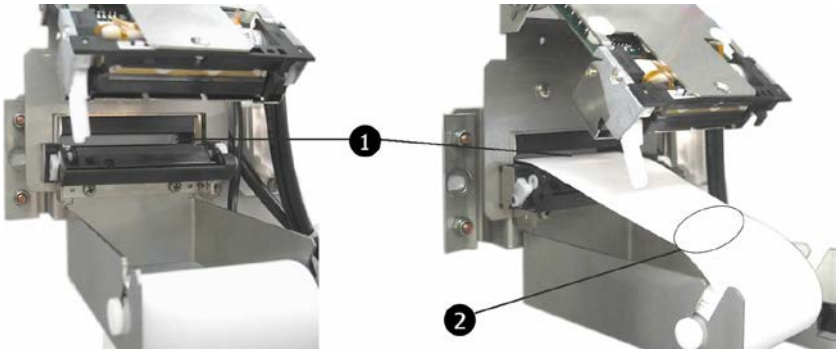

Fig. 68: Feeding paper into the draw-in device

The paper roll is fed into the *draw-in device* ❶ with the *printable surface* ❷ facing upwards.

5. If the paper roll has been inserted flush and correctly, clamp down again the print head onto the paper roll by carefully folding and pressing the printer unit back into its position until the opening handle locks.

NOTICE

Always carefully close the printer.

6. Press *FEED+CUT*:

➤ The paper is fed approx. 2.56 in and then cut off.

19.4.3 Issue test printout

Device switched on.

After inserting a new paper roll:

1. Use the test printout to check whether the paper has been inserted correctly (*printable surface* facing upwards) and whether the receipt printer produces a perfect printout.

2. Press *Reset* + *FEED* ***or*** *Reset* + *FEED+CUT*, depending on which test printout you desire.

➤ The desired test printout is carried out.

19.5 Maintenance services for the receipt printer

19.5.1 Safety

Inappropriate cleaning and basic services

⚠ WARNING

Risk of injury from inappropriate cleaning and basic services!

Inappropriate cleaning and basic services can cause severe or lethal injuries.

- Only trained **shift managers** are allowed to carry out basic services, cleaning and filling work ***inside*** the device as indicated (see list below) and described in this chapter.
- If any other servicing is needed, please contact your Designa electrical technicians or electrical technicians of Designa trained and authorized dealers and partners. (For contact: see the beginning of this operating manual).
- Make sure that cleaning fluids are neither swallowed nor come into contact with eyes.

Electric voltage

⚠ DANGER

Danger of death due to electric shock!

When the device is switched on, the main power voltage (120V) is applied to the following components: Power distribution box, terminal block -X0, power supply unit and to the optional heater and thermostat and, if necessary, to further optional components *(see chapter Device Description)*.

- Only specially instructed **shift managers** are allowed to carry out certain maintenance and filling work ***inside*** the device.
- Switch off the device *(see chapter 5.3.4 Power distribution box on page 35)* unless the work step requires a voltage supply.
- Be aware that the terminal block -X0 and the power distribution box remain energized (120V) even when the automatic circuit breakers are switched off.

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Inappropriate cleaning

⚠ WARNING

Risk of injury from inappropriate cleaning!

Inappropriate cleaning can cause severe or lethal injuries.

- Only trained **shift managers** are allowed to carry out cleaning ***inside*** the device as indicated and described in this chapter.
- If any other servicing is needed, please contact your Designa electrical technicians or electrical technicians of Designa trained and authorized dealers and partners. (For contact: see the beginning of this operating manual).
- Make sure that cleaning fluids are neither swallowed nor come into contact with eyes.

Inappropriate cleaning with air pistols

⚠ CAUTION

Risk of injury due to inappropriate cleaning with air pistols!

Inappropriate cleaning with air pistols may result in minor injuries or damage to eyes due to flying particles.

- Always wear safety goggles.
- Prevent air penetrating the body through skin injuries.
- Do not aim air pistols at people.
- Only use air pistols with a maximum pressure of 50.8 psi (3.5 bar).
- Only use air pistols with a reduced noise level (multi-hole nozzles).

Hot surface

⚠ CAUTION

Danger of burns!

The surface of the print head and motor may become hot during operation.

Contact with the surface may result in burns.

- Do not touch the print head or motor.

Inappropriate cleaning

NOTICE

Inappropriate cleaning can result in damage of the receipt printer.

- Always print with inserted, suitable paper.
- Do ***not*** touch the print head with pointed or sharp objects.
- Do ***not*** use thinners to clean the transport rollers.
  Recommended cleanser: DESIGNA cleaning fluid

19.5.2 Cleaning the receipt printer with compressed air

1. Switch off the device.

Fig. 69: Releasing the opening lever to loosen the print head from the paper reel

1 Opening lever
2 Printer unit
3 Print head
4 Paper guide

2. Loosen the *printer unit* from the paper reel by releasing the *opening lever*:
3. Clean the *printer unit*, *print head* and *paper guide* with compressed air.
4. Clamp the *print head* back onto the paper reel by carefully folding and pressing the *printer unit* back into its position until the *opening lever* locks.

NOTICE
Always carefully close the printer unit.

5. Switch on the device.

19.5.3 Cleaning the receipt printer using cleaning strips

Switched on device:

1. Remove the paper reel *(see chapter 19.4.2 Insert new paper roll on page 125)*.
2. Guide the cleaning strip through the receipt printer using the FEED button.
3. Repeat this process several times.
4. Remove the cleaning strips and reinsert the paper reel.

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20 RFID (Hands-free Identification) (optional)

A convenient entry check is enabled by using a hands-free identification system at the control devices. For the **additional payment** and **renewal** of **RFID** cards antennas can also be mounted to Automatic Pay Stations.

The transmitter-receiver antennas are installed either in the device's monitored area or directly on the device. When **RFID** cards are brought closer to the antennas (if necessary, after occupying loop V), a radio link is created and the antenna receives the relevant card data (min. card number; with **EasyMove** cards, e.g., also the parking facility number and the **type of item**). The antenna signal is processed via a controller in or on the device or directly at the antenna and then transmitted to the **TCC/SBC**. The data is requested at the **System server** and checked for certain parameters.

If the **RFID** card is a valid ABACUS **type of item** (e.g. **monthly card**) and valid for the parking facility, the barrier gate opens. A roller door or similar object can be controlled instead of a barrier gate.

---

i With hands-free processes, information for processing is in the **System server**. Thus, actions with RFID cards are **only limited offline compatible**:
For every process at the devices, information has to be requested via an intact data line[31].

The following hands-free systems, which allow various reading distances for hands-free operation, can be used in the ABACUS system:

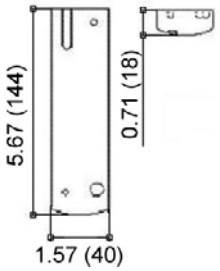
- EasyMove
- Short Range RFID system:
  Legic Proximity System, Mifare Proximity System, ISO 15693 Proximity System
- Long Range RFID systems:
  RFID systems with UHF technology

[31] Cards can also be processed **offline** with the hands-free system **EasyMove**:
Up to 1250 card movements can be stored at the **TCC/SBC** and transferred to the **System server** when the device is **online** again.

20.1 EasyMove

20.1.1 EasyMove antenna (EMA)

EMA 090-2



The EMA 090-2 is suitable for short range distances, e.g. for EasyMove operation at Automatic Pay Stations or for checking entry at doors or into security areas.

- Range with active EasyMove card: approx. 11.8 in (approx. 30cm)
- Range with passive EasyMove card: approx. 3.15 in (approx. 8cm)
- Operating frequency: 125 kHz

Fig. 70: EMA 090-2: Approx. dimensions in inch und (mm)

20.1.2 EasyMove cards

EasyMove cards are programmed with a fixed identification number. This is either pre-programmed by DESIGNA or can be allocated to the card via an optionally available programming device.

Passive or *active* EasyMove cards are available:

Active cards 928 are equipped with lithium batteries and thus achieve the largest ranges in the EasyMove system. *Passive cards 938* in the form of a credit card are supplied with the necessary energy by the antenna and thus achieve approx. 75% of the efficiency of the active cards. These cards can be additionally equipped with a magnetic stripe or contact chip. Both cards can be used together, thus allowing choice of the most suitable card according to the required purpose.

The *Transponder 970* has been developed for very reliable identification of vehicles at large distances. This transponder is attached to the underside of a vehicle and is extremely robust and resistant. Due to a powerful lithium battery, data is still transferred safely even during strong interferences.

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Technical data

	Active cards	Passive carte	
Housing	synthetic (ABS)	PVC	ABS
Thickness	0.11 in (2.8 mm)	0.04 in (1 mm)	0.06 in (1.6 mm)
Weight	0.48 oz (15 g)	0.23 oz (7 g)	0.39 oz (12 g)
Operating temperature	-4°F to +122°F (-20° to +50°)		
Type of battery	3V lithium	none	
Service life of battery	up to 7 years	-	
Range	up to 39.4 in (100 cm)	up to 11.8 in (30 cm)	
Magnetic stripe	no	possible	no
Color	gray	white	gray

Dimensions

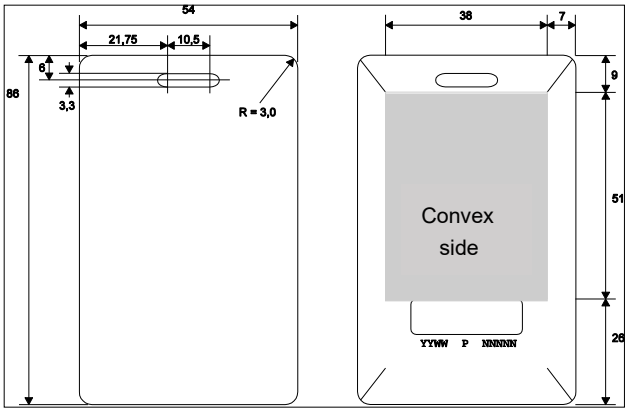

Fig. 71: EasyMove card (active): Approx. dimensions in mm

20.2 Short range RFID systems: Legic/ Mifare/ ISO 15693 Proximity Systems

As further ABACUS **RFID** systems, the following RFID systems can be used:

- Legic Proximity System (operating frequency: 13.56 MHz)
- Mifare Proximity System (operating frequency: 13.56 MHz)
- ISO 15693 Proximity System (operating frequency: 13.56 MHz)
- HID Proximity System (operating frequency: 125 kHz)
- HID Hybrid card reader (operating frequency: 125 kHz and 13,56 MHz)

The following are required (e.g. from your time recognition system):

- **RFID** cards
- system specific antennas
- system specific card reading devices (in order to allocate the card numbers as **types of tickets**)

20.2.1 RFID cards

The **RFID** cards of the Legic Proximity System, Mifare Proximity System and ISO 15693 Proximity System are based on flexible identification standards for hands-free applications.

The cards are equipped with a card number (usually a serial number) which can be read by the system specific antennas and reading devices.

These are passive cards which do not require batteries, the required transmission energy is provided by the antenna.

The cards usually come in a “credit card format” (ID-1 format): 3.37x2.13 in (85.60x 53.98 mm).

Fig. 72: Example Mifare card

> **i** Ask your DESIGNA service whether existing ABACUS system cards (e.g. from your time recognition system) can be used).

20.2.2 System-specific antennas

Fig. 73: Example: Antenna

Antennas in the ABACUS system are installed behind the reading panel cover or directly in the reading device.

Antennas of the Legic Proximity System, Mifare Proximity System and ISO 15693 Proximity System and HID Proximity System are short reading-range antennas:

- Legic antenna range (passive card): approx. 1.57 in (approx. 4cm)
- Mifare antenna range (passive card): approx. 1.97 in (approx. 5cm)
- ISO 15693 antenna range (passive card): approx. 1.57 in (approx. 4cm)
- HID ProxPoint Plus® antenna range (passive card): approx. 1.97 in (approx. 5cm)
- HID Hybrid card reader range (passive card) approx. 1.97 in (approx. 5cm)

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20.2.3 System-specific card reading devices

The system specific card reading devices are connected to the operating PC **WS 120**.

The devices read the **RFID** card number and relay it to the PC application **WinOperate** when **producing** the card: The card number is registered as a **monthly card** together with the necessary card information in the **System server** *(see the separate operator manual WinOperate).*

20.3 Instructions for RFID cards

- ⇨ Protect RFID cards against extreme cold and heat as well as temperature fluctuations:
  Pay attention to the temperature ranges specified by the card manufacturer.
- ⇨ Make sure the cards are not bent or folded:
  Pay attention to the specifications of the card manufacturer.
- ⇨ Protect the cards against direct sunlight.
  (Sunlight will fade their color over time, cause the cards to warp or bend and impair the RFID technology).
- ⇨ Protect cards with additional magnetic stripes against magnetic fields, e.g. against magnetic print heads and certain electronic devices (such as radios or loudspeakers).
- ⇨ Do not allow the cards to come into contact (plastic becomes brittle) with aggressive solvents (e.g. gasoline, methylated spirits, etc.).
- ⇨ Do not keep the cards in soft PVC holders or wallets (risk due to PVC softeners or leather tanning agents).

21 Decommissioning, Disassembly and Disposal

21.1 Safety

Electric voltage

⚠ DANGER

Danger of death due to electric shock!

Contact with live components may result in death.

- Decommissioning and disassembly have to be carried out by electrical technicians or Designa electrical technicians or electrical technicians of Designa trained and authorized dealers and partners.
- Make sure that the power supply is ***externally*** disconnected and that it cannot be switched on.
- Test for absence of voltage.

Heavy weight

⚠ WARNING

Risk of injury when lifting heavy objects alone!

The weight of heavy objects can severely injure a person.

- Never attempt to lift the device on your own.
- Always wear safety shoes.

Occupational safety and environmental protection

⚠ WARNING

Risk of harm to humans and the environment as a result of improper disposal of the device PAY CASHLESS or components.

Improper disposal of the device or components can be harmful to human health and the environment.

- Disposal may only be carried out by qualified specialists.
- Pay attention to valid country-specific environmental regulations.

Occupational safety and environmental protection

⚠ WARNING

Risk of harm to humans and the environment as a result of improper disposal of rechargeable batteries and batteries.

Improper disposal of rechargeable batteries and batteries can be harmful to human health and the environment.

- Remove batteries and rechargeable batteries from all the components.
- Dispose of the batteries and rechargeable batteries according to valid country-specific environmental regulations.

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21.2 Decommissioning and disassembly

1. Disconnect the device from all sources of supply *(see chapter 8 Connection on page 50)*.
2. Disassemble the device in reverse order to assembly *(see chapter 7 Installation on page 44)*.
3. Disassemble the device into its individual parts.

21.3 Disposal

The device consists of recyclable materials.

⇨ After correct disassembly, sort the materials back into specific material types and recycle them.

22 Glossary

A

Additional payment

An **additional payment** can be charged for **monthly parker** or **value cards** or other **items** with special online application.

A **monthly card** is charged an additional payment if the monthly parker is still in the parking facility when the card validity runs out. In this case, the rate is calculated from the end of validity until the time of payment. If not additionally paid for, the monthly card is withdrawn and marked as deleted at the exit. A monthly card also has to be additionally paid for if parking occurs outside **the group time**. On which rate this additional payment is based in both cases depends on the configuration of the **monthly parker group**. A transient rate is used if no special charge has been defined as additional payment.

A **value card** is charged an additional payment if the parking fee exceeds the residual value of the value card. The customer has to pay the difference at an automatic or manual payment system or (if possible) at an exit.

Other **items** with special online application are charged an additional payment if the **group time** is exceeded: When the selected parking duration is exceeded, additional payment is due according to the rate ID for additional payment assigned in the Item details.

The payment device must be **online** to carry out an additional payment in a barcode system.

Advance payments, accepted

A payment which can only be partially paid (example: the customer has insufficient change) can result in this amount being credited to the ticket during cancellation. This part payment is listed as an **accepted advance payment** in the operating report.

The customer can pay the residual fee at a later date at the same or another automatic payment system. The previous accepted advance payment is then booked as an **offset advance payment**.

Crediting during cancellation at an automatic payment system instead of returning the inserted money depends on the device configuration.

Advance payment, offset

If a ticket which has been partially paid (**accepted advance payment**) is fully paid at a later date, the previous accepted advance payment is booked as an **offset advance payment**.

The previous incomplete payment from the accepted advance payment has now been completed. Therefore, offset advance payments are listed in the operating report the same as other payments, accepted advance payments are considered separately.

Alarm message

All the occurrences in the ABACUS system, e.g. *barrier broken*, *door to the pay station has been opened* etc., are displayed as **alarm messages**. Every possible alarm message is assigned an alarm number.

If something occurs at a device an alarm message is sent from the device to the **System server**, which not only logs the name and number of the alarm message but also the **TCC/SBC no.**, date and time. The alarm messages are registered in a database in the **System server** and can be displayed at the **WinOperate**.

Anonymous

In the ABACUS system, **monthly cards**, **value cards** and **congress tickets** can be issued as **anonymous** cards. This may be necessary due to data protection provisions, e.g. if the trips of employees should not be recorded.

All the event and receipt information of anonymous cards is recorded without card numbers. This ensures that the cards remain relevant for parking occupancy, turnover etc. However, the history of these cards – i.e. their trips and payments – is thus invisible in the corresponding **WinOperate** functions (e.g. *event details* and *ticket tracking*).

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B

Blacklist

Cards which are not desired in the facility can be detected at the devices with the ABACUS system's **blacklist**. Cards can be put on the blacklist automatically by the system (**card not entered**) or manually. Blacklist cards are, according to the device configuration, either refused, withdrawn and/or deleted.

Blacklist check

The **blacklist check** can be switched on or off for each device. In principle, the blacklist-check should be switched on: the device takes the blacklist entries into account and rejects or withdraws listed cards. If the blacklist-check is switched off the device also accepts blacklisted cards.

C

Card not entered

The ABACUS system judges a ticket to be a **card not entered** if only a ticket is taken without an actual entry occurring. The taken ticket is registered immediately as a **card not entered** at the **System server** and this message is then transferred from the System server to all the devices; thus if an attempt is made to use the ticket it is rejected as "invalid".

Charging

Charging is a **value card** function. The decision whether value cards should be charged or not is set during the setting of the **item** value card. The "chargeability" of value cards allows the customer to book a new cash amount onto the card when the original value has been used up. A **partial charging** is also possible: subject to a license

NOTE: The item which has been activated with the setting *Use at TCC/SBC* is used when charging cards at automatic pay stations.

The payment device must be **online** to charge barcode value cards.

Compressed air

In order to clean sensitive operating elements in ABACUS system devices (Multicon or similar devices), it is recommended to use a **compressed air** spray can. By using the spray can, it is possible to remove dust particles, paper chads etc. from the device.

NOTICE: When cleaning with compressed air, always make sure that the nozzle of the compressed air equipment is ***not*** aimed inside the device and that paper chads do not enter the ticket guides.

Suitable cleaning material: see DESIGNA Consumables Catalogue

Congress ticket

Congress tickets entitle repeated entrances and exits free of charge during a set time period. They can be purchased by an organizer before an event (conferences, trade fairs) at a set price and sent to the participants in advance.

Some item details can only be checked **online** in barcode systems (e.g. validity). Therefore, barcode congress tickets are rejected **offline**.

Credited

Credited groups are groups whose incurred fees, after exceeding the **group time** (**additional payment**), are stored at the **System server** and thus can be invoiced at a later date (see operator manual "WebReport"). A credited group does not have to pay an **additional payment** immediately.

A pre-condition for invoicing additional payments of credited items is that the group has the property *Credited*. Recommended: Furthermore, make sure to enter the correct customer data, e.g. address and bank details, for all customers assigned with items with a credited group to ensure later settlement.

Customer related counting

By using **customer related counting** customers can be issued with several **monthly cards** but admission during one time period can be restricted to a specific number of cards (example: A customer wishes to have 4 car monthly cards but only rents 2 parking spaces).

D

DBS (also **System server):** see **System server**

Detector N/ Detector V

For a standard application with two loops, the loop N is located underneath the barrier gate arm as a closing loop and the loop V at the control device as a presence loop.

The signal from loop N is evaluated by the **detector N** and the signal from loop V by the **detector V** and relayed to the barrier control unit for processing.

Device configuration

The device properties are set in the **device configuration** when setting up new devices or when changing existing settings. These are device-specific parameters which can vary according to the installed operating elements and define how the device should "behave" in the ABACUS system. Device configuration is always carried out by your DESIGNA service.

Drive&pay (also KK-EC as STP)

The function **drive&pay** in the DESIGNA parking system allows customers to enter and ***exit*** the parking facility with credit and other customer cards or with SmartCards. The entrance and exit times of the cards are recorded in the **System server** (card number) and subsequently invoiced or (with SmartCards) deducted when exiting. Furthermore, the payment of **transient tickets** is possible at an exit control terminal with the option Drive&pay.

NOTE: The function drive&pay does **not function offline**, i.e. for it to function there has to be communication with the System server.

Drive-through and usage message (graylist): see **Graylist** and **Usage message**

E

EasyMove

EasyMove is the name of the standard **RFID** system which is used for a hands-free entry check in the ABACUS system: combined with an EasyMove antenna the EasyMove cards allow a hands-free entry and exit at a distance of up to 1 meter (depending on the antenna used). EasyMove cards, as with **value cards** or **monthly cards**, are a very convenient way of entering or exiting a parking facility.

Ethernet

Ethernet is a widespread and standardized communication infrastructure for local networks (**LAN**). All devices to be networked have their own IP (Internet Protocol) address, which is used for communication independent of the location. The consistent use of the Ethernet standard for all operating elements enables a diversity of access possibilities and networking types (e.g. fiber optics or wireless **LAN**).

Exit authorization

Certain data is used to write an **exit authorization** onto tickets after valid payment (magnetic stripe systems: magnetically coded, barcode systems: printed at the ticket printer), or the authorization is registered in the **System server** (e.g. RFID or credit cards) and checked at an exit control terminal.

F

Flexi cards

In some systems **value cards** are issued as **flexi cards**. Flexi cards, just like value cards, allow customers to utilize (“park”) an existing value without having to pay at an automatic pay station.

The flexi card allows to enter and exit as often as desired during a set time frame. The amount[32] is deducted from the flexi card during the first exit, every further parking process during the set time frame is free of charge.

The fee for using the flexi card depends on the set **payment type** (GID) in the rate configuration.

Function cards

Function cards initiate certain functions at ABACUS system devices. These are a set of cards which are obtained from DESIGNA with (pre-coded) functions for your system (see separate instructions “Function cards”) or which can be created at a later date at the **WinOperate**.

[32] The fee for using the flexi card depends on the set payment type (GID) in the rate configuration.

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G

GID: see. **Payment type**

Graylist

In the ABACUS system, the **graylist** registers conspicuous cards and reacts to their usage or drive through.

The cards can be allocated the message types **drive-through message** or **usage message**, thus triggering the corresponding **alarm messages** or other set reactions.

Groups, Group details: see **Monthly parker groups** and **group time**

Group time

With the help of **groups** it is possible to divide **monthly parkers** or other **items** with special online application into different groups for which different conditions are valid. This also includes the setting of the **group time**: the length of stay (if necessary, recorded in a contract) for which the customer pays a lump sum.

Thus, a customer who only wishes to use the parking facility at night can be offered a more reasonable price than a customer who wishes to use the parking facility 24 hours a day. It is possible to determine whether customers - outside their group time - are either not allowed to enter or are allowed to enter, but then have to pay a fee for the parking times outside the group time (additional payment).

Barcode monthly cards are rejected **offline**, unless configuration of the barcode system allows monthly cards to enter and exit the parking facility offline. However, the group time will not be checked offline: This means the monthly parker group is not restricted offline by group times.

H

Hands-free identification

The ABACUS system supports various systems for the hands-free identification (also see **RFID**) of **monthly parkers** and **value card** users. The products range from proximity terminals with reading distances of several centimeters to hands-free applications with an operating range of 10 meters. All the systems are completely wear-free since they function without moving parts and electrical contacts.

Hopper

The *change unit* allows change to be given at the automatic payment system. The change unit is equipped with change holders, which are called **hoppers**. The hoppers are "numbered" for **device configuration** (clockwise).

Hotel (as hotel ticket registered cards)

A **hotel ticket** is issued by recoding a transient ticket at the manual pay station or at the application PAY manual touch station. After entering the guests' scheduled departure dates they can use the parking facility as often as desired until the set time.

Hotel tickets are not available for barcode systems.

I

ID medium

Various ID media can be used at the entrance and exit: paper ticket, RFID card, print@home ticket with QR Code (Quick Response Code), smartphone with QR Code, credit card; license plate recognition, customer card or number code.

I/O check

The **I/O check** (Inside/Outside-Check) checks the **I/O identification** of the ticket: On the basis of the **TCC/SBC no.** it is possible to see at which device last use occurred.

If the ticket was last used at an entrance or pay station it is "inside" and next use, if the I/O check is switched on, has to occur at an exit. If the ticket was last used at an exit next use has to occur at an entrance or pay station.

The I/O-check can thus stop, e.g., several vehicles being taken out of the parking facility with one **monthly card**, because after using the card at an exit next use has to occur at an entrance or pay station.

If configuration of the barcode system allows monthly cards to enter and exit the parking facility **offline**, there is no offline I/O check.

I/O identification (wrong)

The last used device (**TCC/SBC no.**) is allocated to the ticket as the **I/O identification**.

If the **I/O check** is switched on the I/O identification is checked and tickets with **wrong I/O identification** are, depending on the **device configuration**, rejected and deleted or withdrawn. An I/O identification is wrong when the logical, alternating ticket pattern of "inside" and "outside" has not been observed (e.g. if two exits, one after the other, are attempted with the same ticket without an entrance having been used in the meantime).

Item

Items are set in order to issue cards of a **type of item** with various properties. The properties depend on the respective type of item.

In order to issue cards in the system, items which can be used at the parking facility have to at first be defined. Items are allocated to a customer, thus **preparing** a card in the system.

K

Keypad

Optionally, a number code can be used as the **ID medium** for **pre-bookings**. This number code is entered at the entrance via a **keypad**.

KK-EC as STP: see **drive&pay**

L

LAN

A **LAN** (Local Area Network) is a locally limited network under control of the owner. In the ABACUS system, the **LAN** is the parking facility network achieved via **Ethernet**. This can include just the parking facility or also company units or networked partners (e.g. multi-facility centres).

Login group

In order to provide **users** with various user rights for the **WinOperate**, the **system logins** are allocated to various **login groups**. The login group specifies which functions are available for the logged in user. The various login groups are *DESIGNA, Administrator*, *Service personnel, Accounting personnel*, *Operating personnel* and *Staff*.

The login group "DESIGNA" has been set solely for your DESIGNA Service for service and remote maintenance purposes.

Lost ticket

A **lost ticket** can be issued to customers who claim to have lost their ticket. To avoid abuse of this function a price is usually charged which corresponds to the per diem rate.

Lost tickets can be issued with the function *Produce lost ticket* at the **WinOperate** or as a special function via a *Lost Ticket* push button at the automatic pay station. For this function an appropriate **Multicon** is necessary.

LPR

LPR (License Plate Recognition) is an image-processing technology used to identify vehicles by their license plates. This technology is used in various security and traffic applications, such as access-control systems.

While the vehicle approaches the barrier, the LPR unit automatically reads and registers the license plate. In the system this license plate data is used as ticket and receipt reference (in some countries required by tax authorities), or can be used for access authorization. In this case the data is compared to predefined lists: The system denies entry if e.g. the Card/ Vehicle allocation does not match or the barrier gate can open automatically for predefined VIP cards.

M

MAC address

The **MAC address** (Media Access Control address) is the hardware address of each individual **TCC/SBC** that is used for permanent identification of the device in the system. The MAC address is permanently assigned to the device and displayed on a sticker affixed to the TCC/SBC (also referred to as the "Ethernet ID" or "physical address").

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Media change

A **media change** involves changing to a different **ID medium** at the entrance control terminal. The parking customer is identified, e.g. via a QR Code (Quick Response Code), and is issued a paper ticket directly at the terminal.

Monthly cards

Monthly cards are issued with certain properties (price, validity, **group time**, with or without **reservation**) in order to offer the ABACUS system's **monthly parkers** different conditions.

This is defined by creating various types of items **monthly card** and various **monthly parker groups**. These are then written onto the monthly card when **producing** (or allocated to a card at the **System server**).

Some item details can only be checked **online** in barcode systems (e.g. validity). Therefore, barcode monthly cards are rejected **offline**, unless configuration of the barcode system allows monthly cards to enter and exit the parking facility offline. However, this results in certain item details not being checked offline (e.g. validity, **group time** or **I/O identification**).

Monthly parker

Monthly parkers are customers who wish to use the parking facility over a longer period and usually pay the incurred fee as a lump sum in advance. They are neither fixed to a certain number of parking processes nor to a set parking duration.

Monthly parker groups / Groups / Group details

Groups are usually set for **monthly cards** (**monthly parker groups**). Additionally, setting groups might also be necessary for other **types of item**, i.e. for their *special online application* (from version x15).

All the monthly parkers within the ABACUS system can be divided into different groups (**monthly parker groups**) for which different conditions are set. For example, a monthly parker group can be restricted to parking at night. A maximum of 14 monthly parker groups with different properties can be active for each parking facility.

The different properties are summarized as **group details** and the group number is allocated to the **monthly card** (or to the other **types of item** with *special online application*).

Monthly parker with reservation/ without reservation: see **reservation**

Multicon

The devices' (write/)read unit is known as **Multicon**. According to the desired function range and used technology (magnetic stripe or barcode), it is necessary to have different versions of the Multicon:

For example, in order to offer the function "**lost ticket**" at the automatic payment system a Multicon with ticket insertion from the rear is necessary, or for credit card payments a Multicon with a "parking position" is necessary.

O

Offline

If a device is **offline** there is no communication between the **System server** and **TCC/SBC**, i.e. ABACUS system's data transmission is interrupted and no data exchange can occur.

Offline, capable of functioning offline

The DESIGNA parking system is **capable of functioning offline** for standard functions: The devices carry on functioning in "stand-alone" operation in spite of the interrupted data line. All the accrued data at the device is accumulated in the TCC/SBC and transferred to the **System server** when online-standby is back on.

There is only a limited offline capability for barcode technology: Barcode tickets contain only partial information for processing.

Some of the other functions (RFID, credit card processing) are not capable of functioning offline: An intact data transmission between **TCC/SBC** and System server is needed[33].

[33] Credit card payments (up to 7) can be accepted if the device is offline (actions are saved in the TCC/SBC). Recommended: Only accept credit card actions if the device is online (standard).

One-use ticket

One-use tickets are issued at the MPS 120 and permit one exit: For example, a transient ticket used to enter the parking facility can be exchanged for a one-use ticket and the parking facility can be exited free of charge (also recommended: use of the function zero fee ticket at MPS 120) or at a fixed price.

Some item details can only be checked **online** in barcode systems (e.g. validity). Therefore, barcode one-use tickets are rejected **offline**.

Online

If a device is **online** there is communication between the **System server** and **TCC/SBC**, i.e. the ABACUS system's data transmission via **Ethernet** is intact and an exchange of data can take place.

Overpayment

Overpayment occurs if the parking fee is smaller than the inserted sum of money and no change can be returned at the automatic payment system (e.g. parking fee= EUR 2.30/ inserted amount= EUR 4.00 with 2x EUR 2.- coins; no change available. Overpayment= EUR 1.70).

P

Park app

The term **park app** is the abbreviation for parking facility application. Application refers to an application program installed on a smartphone or a tablet computer. A **park app** can be used to carry out **pre-bookings**.

Park check

Park checks allocate parking authorization with various temporal conditions. The parking authorization information is coded onto a park check , which can then be used as a chaser card with a **transient ticket** at the automatic or manual payment system (if necessary, also at the entrance control device when without a *recoding fee*). The transient ticket is recoded accordingly and, depending on the temporal conditions of the park check, allows the customer to enter and exit the parking facility.

Park checks are not available for barcode systems.

Parking permission

A parking permission serves to authorize vehicles within a parking system. Parking permissions can take the form of various access media, such as a paper ticket, plastic card, QR code, license plate or RFID card. Depending on the system, they may be valid for a single use, for a limited period or permanently.

Parking swindler: s. **Card not entered**

Partial charging

Partial charging is a function for **value cards**. The decision whether value cards should be partially charged or not is taken during the setting of **item** value card. The partial charging of value cards enables customers to book a new amount of money onto the card when the old value has run out (has been parked). This new amount can be fixed by the customer and can be less than the amount for a (full) **charging**. For this, the value is calculated with the price at a ratio of one to one. The possible issuing of validations due to a favorable price/value ratio is not taken into consideration.

NOTE: The function partial charging is subject to a license.

The payment device must be **online** to carry out partial charging in a barcode system.

Payment type (GID)

Payment types are for example the standard rate which is incurred, certain **types of item** or any functions for which further alternative rates have to be accessed (e.g. additional payment of **monthly cards**).

All the **payment types** which are possible in the ABACUS are allocated a number (GID: Group Identification) and are set in the rate configuration.

PiP

A **PiP** is "a parking facility within a parking facility" in the DESIGNA system: An additional marked off area (e.g. using SPT 120 and a barrier gate) where the entrance is controlled.

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Pre-booking

If the pre-booking option is available in the DESIGNA system, parking facility customers can carry out **pre-bookings**: A planned stay in a parking facility can be booked and paid for in advance via a web application, e.g. at the parking facility operator's website, or via a smartphone **park app**. The **pre-booking** functions are subject to a license and require customer-specific implementation.

Prepaid ticket

A **prepaid ticket** is issued for a set price and is valid until a pre-set exit time on the day of ticket issue. The transient rate can also be the basic rate for a prepayment with a prepaid ticket.

Prepare cards

In order to issue cards in the system, **items** which you wish to offer in your parking facility have to at first be defined. Items are subsequently allocated to a customer, thus **preparing** a card in the system. To finally issue a prepared card to a customer, it has to be **produced**.

The cards are **prepared** in the function *Prepare cards* of the **WinOperate**, i.e. you allocate a previously defined **Item** to a customer.

Produce cards

In order to issue cards in the system, **items** are at first defined and subsequently **prepared** in the system. To finally issue a prepared card to a customer, it has to be **produced**, if necessary at a later date.

The cards are **produced** in the function *Produce cards* of the **WinOperate**, i.e. the data record from **prepare cards** is written onto a paper ticket or allocated to a card at the **System server** (e.g. plastic barcode cards and RFID). From this moment onwards the card is available as a "real" card and can be issued to the customer.

Promotional Codes

In the DESIGNA parking system, promotional codes allow customers to use an **ID medium** (e.g. a barcode or a number code) more than once to enter the parking facility during a specified time period. Promotional codes can therefore be used for temporary special offers (e.g. specially priced parking due to a barcode published in a newspaper).

Promotional codes are defined with specific properties (e.g. valid period, parking facility and max. issue amount) and are stored in the system as **monthly cards**. The preparation of various **monthly parker groups** allows the assignment of numerous rates for a parking facility.

R

Renew

Renewing is a function for **monthly cards**. If a renewing is allowed *Before expiry, After expiry* or *Still allowed* for the item, the parking customers can renew their cards at the automatic pay station themselves during these times; before and after the validity of their cards expires.

The payment device must be **online** to carry out renewing in a barcode system.

Replacement ticket/ Manual replacement ticket

A **replacement ticket** is issued as an identical copy of a ticket which is no longer readable (magnetic stripe or barcode no longer readable by the **Multicon**). The replacement ticket is based on the data of the original **transient ticket**.

For this, the data of the original transient ticket is entered at the WinOperate or at the MPS in order to retrieve it from the **system server**: At the MPS this is done according to the ticket's **serial no**. At the WinOperate this is done according to the ticket's serial no., its LPR identification (only optional **LPR**) or according to it's receipt no. This way a replacement is issued for the previously issued ticket. Usually, the replacement ticket has to be paid at a pay station before exiting (Exception: a replacement ticket is issued for a just paid transient ticket).

A **manual replacement ticket** can be issued at the WinOperate: For this, the **user** defines the desired data for producing a **replacement ticket**.

The data is created as for an entrance of a transient ticket (date, TCC/SBC and time). This way, a new, unpaid ticket is issued, whose entered entrance data will be valid for its subsequent payment. The manual replacement ticket has to be paid at a pay station before exiting or it can be issued in a way that payment occurs immediately during **production** (at the pay station).

Reservation, With (diverse types of item)

The ABACUS system provides **items with** and **without reservation**:

A certain number of parking spaces are reserved for items **with reservation** in order to guarantee a free parking space (e.g. specially marked spaces). Items **with reservation** are counted separately and can still enter the parking facility even if all the transient spaces are full and transients and items **without reservation** are denied.

The **types of item monthly card**, **value card** and **congress ticket** can be assigned with reservation. This is done in *Manage items* of the **WinOperate**.

Reservation, Without (diverse types of item)

The ABACUS system provides **items with** and **without reservation**:

Items without reservation are counted as **transients** by the parking counters, i.e. in a parking facility occupied with transients all subsequent cards without a reservation are refused entrance. The message "Parking facility occupied" appears on the display at the entrance.

Reset

In principle, there is a differentiation made between the following types of **resets** which produce different effects at the devices and in the system communication. A reset is selected from 6 various types of **Reset**.

- Reset 0
  Reset 0 causes a type of "cancellation": A current payment at an automatic payment system can be
  cancelled from **WinOperate**.
- Reset 1:
  Reset 1 puts some TCC/SBC processes in a basic condition.
  NOTE: This can cause operating irregularities as device component processes are not put in a basic condition. For this reason Reset 1 is not used in normal operation.
- Reset 2:
  Reset 2 causes the respective device to be switched on and off like during a "manual" restart. Recommendable for clearing smaller operating faults.
- Reset 3:
  Reset 3 causes configuration data to be transferred from the **System server** to the TCC/SBC Part of this configuration data is, e.g., price or group data.
- Reset 4:
  Reset 4 transfers the executing program for the individual control of a device to the TCC/SBC.
  NOTE: A Reset 4 deletes all the existing alarm messages in the TCC/SBC which have not been transferred to the System server.
  Before carrying out a Reset 4 use Reset 2 to make sure that all the alarm messages have been transferred (approx. 2 min in advance).
- Reset 8:
  Reset 8 is only used for service purposes during the new configuration of a TCC/SBC.

Resin-Free Oil

Only use **resin-free oil** to lubricate moving parts.

(Recommended: Ballistol oil spray, DESIGNA Ident. no. 8 815 057 000)

RFID

Radio Frequency Identification (**RFID**) enables the hands-free data registration and customer identification. RFID enables rapid processing (also of various systems, e.g. time recognition and entrance) and is maintenance-free.

An RFID system always consists of data media (**RFID** cards with chip and antenna) and a reading device (antenna and decoder/controller).

Magnetic or electromagnetic fields are used for data transmission.

S

SBC

A **SBC (Single Board Computer)** is used in the ABACUS system. The SBC manages and controls the device functions with the individual program of a device.

The SBC is centrally controlled by the **System server** and identified and addressed via IP addresses. Possible signal conversion for parallel device components (i.e. barriers) takes place via the optional module *I/O interface*.

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Serial no.

Each ticket and each card is allocated a precise **serial no.** in the ABACUS system. The serial no. can be used as successive numbers or in 3 blocks.

For **transient tickets** the serial no. is made up of the system no., TCC/SBC no. and the ticket no. It is allocated and printed onto the ticket at the entrance. The serial no. is requested in several functions to locate data sets (e.g. issuing of **replacement tickets** at the MPS or ticket tracking and issuing of replacement tickets at the **WinOperate**). In magnetic stripe systems the serial no. is printed in line 1 of the printed ticket information (standard printing line for the entrance information) or can, according to the (Multicon) **configuration**, be printed in line 8 (extended ticket imprint of the entrance) (also see document “MC 120 TICKETS“ (specification of the tickets and their printed areas)). In barcode systems the ticket no. is not numbered consecutively and the serial no. needs to be set as printed in its own line in the Multicon configuration.

For **monthly cards**, **value cards** and **congress tickts** the serial no. is made up of the system no., TCC/SBC no. and the card no. which has been assigned when **preparing** the card. The serial no. of these **types of item** is only printed onto the tickets and cards if this is set accordingly at the WinOperate (*Manage items*) (***never*** print onto plastic cards).

Shift manager (also called route man)

The operator is allowed to conduct maintenance, cleaning and filling work with an instructed and basic training skilled **shift manager**. These works are indicated and described in the main chapter *Maintenance* as well as in the maintenance sections of the individual modules.

Shift managers conducting maintenance, cleaning and filling work ***inside*** the device need to be specially instructed and trained on power supply disconnecting features and on the working steps to be carried out in the device interior.

Special income

Special incomes in the DESIGNA parking system do not relate to parking fees but to other types of incomes, e.g. services such as car washing, parking facility security etc.

System login

Before **WinOperate** can be opened, thus allowing access to the ABACUS system, the **user** has to provide identification. This occurs via the so-called **system login**, a combination of user name and password: A login window in which ID can be entered appears prior to the start. Menu items and functions can be switched off depending on the **login group**.

System server

The **System server** is the PC or the server platform for controlling, monitoring and administrating the parking system DESIGNA.

The operating interface **WinOperate** is installed at the DESIGNA operating work station **WS 120** and communicates via **Ethernet** with the System server. The application WinOperate is located on the actual System server (DBS COMPACT and COMPACT PLUS) for smaller parking facility systems.

System times

In the ABACUS system it is possible to define times as **system times**. These times influence the rate calculation for each facility: e.g. *grace time* (time period by which a rate step can be exceeded before the next rate step is calculated), *lag time* (maximum length of stay in the facility after payment) or *free passing time* (a customer’s maximum length of stay in the facility before payment is due at an exit device).

T

TCC

A **TCC** of type SCC or LCC is used in the ABACUS system. The TCC with Linux operating system manages and controls the device functions with the individual program of a device.

All TCC are centrally controlled by the **System server** and identified and addressed via IP addresses. The internal device communication takes place via serial connections. Possible signal conversion for parallel device components (i.e. barriers) takes place via the optional module *I/O interface*.

TCC/SBC address/TCC/SBC no.

TCC/SBC addresses are used in the ABACUS system in order to enable a purposeful transfer of commands and programs and an identifiable data exchange between the device and the **System server**. These are configured according to the device features and are programmed at the **TCC/SBC** (the device and TCC/SBC **configuration** is usually carried out before delivery or by your DESIGNA Service).

The TCC/SBC address set at the TCC/SBC and configured in the System server corresponds to the **TCC/SBC no.** requested in many functions.

Theater rate

The **theater rate** allows you to charge a separate price at automatic pay stations[34] for **transient tickets** which enter the parking facility during a certain period, if the payment also occurs in this time period. Customers pay according to a defined price calculation (payment type (GID)) up until the specified exit time.

This ensures that payment can be carried out in advance, e.g. to prevent queues at pay stations after events.

The transient tickets can exit the parking facility until a specified time in the future. If a customer exits the parking facility after this specified time, the transient rate is charged as additional payment.

Ticket medium

In the DESIGNA system, the **ticket medium** stands for the "carrier material" that transports unique data records. The unique data records (card ID) consist of a) the respective authorization (e.g. event ticket, weekly ticket, staff card) and b) the user of this authorization (e.g. customer, event, company, employee).

The ticket medium is linked to a unique ticket ID in the system.
Depending on the medium used by the car park customer for identification at the entrance, automatic pay station or exit, a corresponding system comparison is made to the authorization assigned to the ticket medium. This can be, for example, the **serial number** of a ticket/card produced, the hash code of a credit card, the QR code content, the UIDs of RFID cards or the license plate (for VIP or Ticketless).

Time check: see **value and time check**

Time slot

Time slots help to statistically analyze parking processes in the ABACUS system. They are used to divide and record the parked times into ranges. The parking durations can then be displayed with the *time slot statistic* of the **WebReport** application (e.g.: How many transients use 2 or 4 hours as a parking duration?). Up to 50 time slots can be defined.

Token

Token are coins to which a certain value is allocated. The coin validator recognizes certain features of a token the same as it does with coins. Tokens are valued and processed as coins at the automatic pay station (not intended as change).

Tokens can be configured as *value tokens* or as *free tokens* (**device configuration**): A *value token* is allocated with a certain cash value. The value of a *free token* is set at the automatic pay station to the same amount as the incurred parking fee, thus allowing free parking.

Traffic jam detection

For **traffic jam detection** at the exits, the system monitors how well the lag time can be observed. This is achieved by continuously determining the average time required by parking facility customers from the pay station to the exit. If this average time and the lag time converge at an exit, the **alarm message** “Traffic jam at the exit" is generated (when the difference between the average time of the last 10 parking facility customers and the set lag time is less than 60 seconds).

It is possible to react to this alarm message by increasing the lag time by 20% at the affected exit via **WinOperate** or it can also be increased automatically by the system: There is a reduced risk of paid tickets losing their **exit authorization**, resulting in further payments due to the jam.

[34] Depending on the device configuration, the theatre rate can, e.g., be activated at just one pay station of a parking facility or by selecting it via the lost ticket button.

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If the average time and the already increased lag time also converge, the alarm message is regenerated and the lag time can be increased by another 20% at the affected exit via WinOperate or automatically by the system.

The increased lag time remains active at this exit until it is reset to the original lag time at WinOperate or automatically by the system.

Transient

Transients are customers who request a **transient ticket** at the entrance and enter the parking facility with this ticket. After paying the fee (at an automatic pay station or MPS as well as at an exit, see **drive&pay**) the customer can exit the parking facility. The fee depends on the parking duration and parking time.

Transient ticket

The **transient ticket** is issued to the user upon request when entering the parking facility (express entrance: automatically). The parking fee is calculated on the basis of the ticket's entrance data. The fee has to be paid prior to (or while) exiting.

Type of customer

Types of customer can be used in the ABACUS system to divide the master data in *Manage customers* (**WinOperate**) into categories. This ensures that functions can only be available with assigned types of customer for certain **users**.

Type of item

The ABACUS system provides numerous **types of item** (e.g. **monthly cards**, **value cards** and **function cards**) in order to cope with the needs of the parking facility customers.

U

Usage message and **drive-through message (graylist)**

In the ABACUS system, the **graylist** registers conspicuous cards and reacts to their usage or drive through.

The cards can be allocated the message types **drive-through message** or **usage message**, thus triggering the corresponding **alarm messages** or other set reactions (*Manage cards/ Comments tab, Blacklist & Graylist* in **WinOperate**).

Cards or license plates (only optional **LPR**) entered in the system with the **usage message** trigger the alarm message no. 213 or set reactions when ***used*** at any device (card insertion at the device or an **RFID** card request).

Cards or license plates (only optional **LPR**) entered in the system with the **drive-through message** trigger the alarm message no. 186 or set reactions when ***driving through*** an entrance or exit.

These alarm messages (no. 213 and no. 186) are also individually set to ensure that usage or drive through of the card (or e.g. the entrance of a license plate) is displayed as desired (*Set alarm messages* in **WinOperate**).

User

To ensure that only authorized personnel operate the system operating personnel have to register and deregister as a **user** prior to and after working at the **WinOperate**.

Users are registered as customers in *Manage customers* at the WinOperate and are allocated a **system login**. Menu items and functions can be switched off depending on the **login group**.

V

Valet Parking

Valet Parking refers to the parking of vehicles by an employee. The vehicle and the key are left with parking authorized staff (jockeys) at a central drop-off point. A jockey then parks the car on behalf of the owner and, when requested, returns it to the pick-up area. This parking service is offered, e.g., by hotels and airports.

Value and time checks

Value checks are tickets which are used as means of payment in the DESIGNA parking system. A certain money value is assigned to the ticket which can be used as payment at the pay stations and some exits (only **drive& pay**).

In contrast to value checks, a time value instead of a money value is coded onto **time check**. They can also be used as means of payment by reducing the incurred parking duration at the pay station or at an exit.

Value/Time checks can be allocated to, e.g., participating shops by the facility operator in order for these shops to offer their customers reduced parking costs in the interest of customer retention. There are two different ways of charging the participating shops (or similar) for the value/time checks:

- The assigned money/ time value is charged 100% when issuing or
- only the actual amount of money/time used by the customer is charged (e.g. for **overpayment** with value/time checks).

The **device configuration** specifies whether just ***one*** value/time check can be used as a payment medium at the device or any number of checks.

Some item details can only be checked **online** in the barcode system (e.g. validity). Therefore, barcode value checks are rejected **offline**.

Value cards

Value cards are coded with a certain value (amount of money or time) and subsequently sold to the customers at a set price. The incurred parking fee or time is deducted from the value card when exiting. This has the advantage that the customer does not have to pay at the automatic pay station. The residual value of the card is shown on the display when entering and exiting. In addition to this, the value card can be used to offer the customer a concession by choosing a price which is less than the coded value.

Different properties can be issued for value cards: for example, the validity of the card can be set, a favorable value/price ratio issued or a later **charging** of the value card provided for if the value has run out.

Some item details can only be checked **online** in barcode systems (e.g. validity). Therefore, barcode value cards are rejected **offline**.

W

WebReport

WebReport enables professional statistical reporting of parking data in the ABACUS system. Statistical values are analyzed rapidly, precisely and clearly.

Reporting of:

Time slot statistics, throughput statistics, occupancy statistics, payment statistics, alarm statistics, operating report, cash book, value card balance, rate switch card report, value checks/ time checks settlement, park check report, card lists, customer lists

WinOperate

The **WinOperate** is an easy-to-use graphical Windows® interface which allows the user to check, monitor and control processes in DESIGNA as well as manage system data and present business figures.

The operating interface WinOperate is installed at a DESIGNA operating work station **WS 120**, which communicates via Ethernet with the **System server**. The application WinOperate is located on the System server DBS COMPACT and COMPACT PLUS for smaller parking facility systems.

WS 120 (also work station, operating PC)

The **WS 120** is the operating work station of the DESIGNA parking system which communicates with the **System server** via **Ethernet**. In connection with WinOperate the WS 120 provides extensive monitoring, controlling, administrating and reporting functions. Several WS 120s can be networked and access the data and control of one parking facility.

The application WinOperate is located on the actual System server (DBS COMPACT and COMPACT PLUS) for smaller parking facility systems, a separate PC WS 120 operating work station is then not required.

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24 Version overview

Version 1.00 US, 2018-07 (SU)

Creation of the document

Version 1.10 US, 2022-01 (SU)

Updated

Version 1.20 US, 2024-12 (GN)

New layout

New standard color RAL 7012 (basalt gray)

Version 1.30 US, 2026-07 (KS)

- General: Information on the digital user manual
- Operation: Payment with credit cards and girocards: Receipt printing optionally configurable
- Operation: Digital receipt printing added
- Operation: Receipt printing/Automatic receipt printing: Receipt printing optionally configurable; note on WinOperate
- Operation/ Ticket Shop renamed to PARK SHOP
- Operation/ PARK SHOP: Recoding added
- Operation/ Issue individual parking permissions

Subject to technical changes.

The parking system ABACUS is continuously advanced and improved. Please contact your Designa Service about changes and additions to these operating instructions.

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