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WINCOR NIXDORF

Self-Service Systems

Cash Media Dispenser Version 4

Service Manual

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... any questions or suggestions
regarding this manual?

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Cash Media Dispenser Version 4

Service Manual

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This manual was
produced using paper
treated with chlorine-free bleach.

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Abbreviations

A

AGT	Output transport
ASCII	American Standard Code for Information Interchange
AZM NG	Cash-out module - new generation

B

BBA	automated teller mashine which is operated by employees

C

CEN	Comité Européen de Normalisation (European Committee for Standardization)
CG	Clock Generator
CL	Clutch
CL	Electromagnetic Clutch
CMD-V4	Cash Media Dispenser Version 4
CMD-V5	Cash Media Dispenser Version 5
CMOS	Complementary Metal Oxide Semiconductor
CPU	Central Processing Unit
CTS	Clear To Send

D

D-SUB	Connector series D, subminiature
DC	Direct Current
DCD	Data Carrier Detect
DCM	Direct Current Motor
DDU	Double Note Detection Unit
DES	Data Encryption Standard
DIN	German Institute for Standardization
DMA	Direct Memory Access
Dot	Refers to a printed dot
dpi	Dots per inch
DPS	Digital photosensor
DSR	Data Set Ready
DTR	Data Terminal Ready

E

EEPROM	Electrical Erasable Programmable Read Only Memory
EMA	Intruder alarm system
EU	European Union

F

FIFO	First In - First Out
FL	Frontload
FRU	Field repair unit
FW	Firmware

G

GmbH	Limited liability company
GND	Ground

H

H	High
HDM	Horizontal Dispense Module
HEX	Hexadecimal

I

IR	Infrared

K

KDIAG	Components Diagnostics

L

L	Low
LED	Light-Emitting Diode
LS	Photosensor

M

MA	Magnet

N

NRZ	Non return to zero

O

OEM	Original Equipment Manufacturer

P

PC	Personal Computer (system unit of the device)
PCS	Print Contrast Sensitivity
PLD	Programmable Logic Device
PROM	Programmable Read Only Memory
PS	Photosensor
PSD	Photosensor Dispense (sensor for dispensing process)
PSE	Photosensor Empty (cassette empty sensor)
PUT	Power up test

R

RAM	Random Access Memory
RI	Ring Indicator
RL	Rearload
RS232	Recommended Standard 232
RTS	Request To Send
RxD	Received Data

S

SAT	Stacker and output transport
SELV	Safety Extra-Low Voltage
SM	Stepper Motor
SNR	Serial number recognition
ST	Connector
SW	Software
SW	Switch

T

TH	Thermal printer
TTL	Transistor-Transistor-Logic
TxD	Transmitted Data

U

UPS	Uninterruptible Power Supply
USB	Universal Serial Bus
UT	Under-counter

V

VCMD	Vertical Cash Media Dispenser

W

WN	Wincor Nixdorf International GmbH

Introduction

This service manual has been compiled for authorized Service personnel only. The operating and installation instructions and the service manual of the base device should also be read since certain details are only described in these instructions.

Symbols used in this manual

– Text following a dash represents an item in a list.

" " Text in quotation marks refers to other chapters or sections in this document.

- Text following this symbol describes actions to be performed in the specified order.



Text following this symbol should be given special attention in order to avoid damage and injury.



Text following this symbol contains general information to facilitate use of the device and help avoid operating errors.

Important Safety Instructions



Please read the following notes carefully before conducting any work on the device.

Be careful not to injure your head when the customer panel or the operating unit door are lifted up!

Be careful not to injure your head when the customer panel is raised!

Be careful not to injure your head when the operating unit door is lifted up!

Make sure no water/liquids (e.g. rain, snow, etc.) get into the open device and the exposed components, especially under adverse weather conditions, as this could pose a danger to your life.
Make sure you take suitable precautions when working on an open device (e.g. by covering components where necessary) so that fluid cannot enter the open device.

Installation note

- When installing the device or doing any work on the device make sure that the device is not connected to power.
- Remove the shipping restraints inside the unit which secure its components during transportation if necessary for the installation (see enclosed information sheet).

General safety precautions

This device complies with the relevant safety regulations for information processing equipment.

- For reasons of stability, the device must be screwed to the load-bearing substructure of the installation site or mounted on a suitable base.
- When moving the device from a cold to a warm environment, do not operate it for at least two hours to prevent possible damage caused by condensation. do not operate it for at least two hours to prevent possible damage caused by condensation.
- Use only the original packaging material to transport the device.

- Note the warning and information labels on the device.
- Unless otherwise stated, grasp the components only by the green ledge when handling them.
- The device is equipped with a safety-tested power cable. The. which must be connected only to a suitable grounded outlet.
- Always hold the plug when removing the power cable. Never pull the cable itself.
- Lay all connecting cables in such a way that they will not be stepped on or tripped over, damaged or crushed in any way.
- Have damaged power cables replaced immediately.
- Make sure that there is always free access to the sockets used or to the electrical circuit-breakers of the house installation.
- In case of an emergency (e.g. damaged housing, controls or power cables, water or foreign objects in the device), proceed as follows:

  Deactivate the device immediately by:

  Switching off the automatic circuit breaker or removing the fuse insert from the fuse holder in the distribution box of the building's electricity distribution cabinet.

  Disconnecting the plug of the power supply cable from the grounded socket in the building installation;

  Switching off the ON/OFF switch on the power distributor.

  Interrupting the power connection, if there is one, between the UPS (uninterruptible power supply) and the device (see section "General power interruption").

- Never connect or disconnect data transmission lines during a thunderstorm.
- Always keep the device's vents free from obstruction to ensure proper air circulation and to prevent malfunctions resulting from overheating.
- Only use accessories and extension components that have been approved by us. Nonobservance can result in damage to the system or violations of regulation concerning safety, radio interference and ergonomic requirements.

- Note that there are only safety extra-low voltage circuits (SELV circuits) if you want to feed voltage from an external source into prepared cables to install additional electronics (e. g. EMA connection, relay panel for external features).
- Only use cleaning agents approved by WINCOR NIXDORF International GmbH for cleaning and maintenance (see chapter "Maintenance and service").

Repairs



Repair work may only be carried out by authorized personnel.

Unauthorized opening of the device or repair work carried out improperly could result in considerable danger to the user.

In case of noncompliance, WINCOR NIXDORF International GmbH excludes all liability.

Lithium batteries



The handling and the replacement should only be performed by authorized service personnel who were trained by the WINCOR NIXDORF International GmbH.

There is danger of fire or explosion if the batteries are handled improperly. It is therefore important to note the following points:

- Avoid short circuits
- Never recharge the battery
- Avoid temperatures above +100 °C (+212 °F).
- Do not try to open the battery by force
- Do not allow the battery to come in contact with water or fire

The battery should only be replaced with the same or an equivalent type recommended by WINCOR NIXDORF International GmbH (see chapter “Appendix,” section “Consumables”).
Dispose of used batteries in compliance with national regulations and the manufacturer's specifications.

Start-up

i Before operating the device, remove all parts inside of it which secure its components during transportation or check whether they have been removed (see info sheet supplied with the device).

Structure of the manual

Outline

The chapter "Introduction" describes the important safety precautions. It also gives an overview of the Cash Media Dispenser.

The in the chapter "Device Overview and operation" describes inter alia how you can replace the cash-out cassette and the reject/retract cassette and how you can fill the cash-out cassette and set the banknote size.

In the chapter "Description of the components" is a description of the essential funtions of the individual components of the Cash Media Dispenser.

The chapter "Start-up" is about the initialization of the CMD-V4.

This is followed by several chapters that describe the sensors/actuators and the courses in the CMD-V4.

In the chapter "Troubleshooting" are possible actions listed which are necessary to eliminate a malfunction properly.

The next chapter "Removal/Installation of Components" provides information on how to replace components.

The chapter "Maintenance and Service" contains information on maintenance work to be carried out regularly.

In the chapter "Appendix", the "Pin assignments" are listed.

The features of the CMD are described in the chapter "Appendix" in the section "Technical data".

Supplementary documentation

Instruction manuals in several languages are available for the operation of the base devices, which contain also a description about the CMD.

These manuals can be ordered from our print partner. They are also available in the intranet.

Usually the manufacturers' original manuals for OEM components are included in the shipment. They may contain more detailed information.

Manual release

Since production began, some components have been replaced for various reasons (e. g. progress in technology, cost reduction).

Often the hardware replacement does not result in a changed construction of the device (mechanical or electrical) or the functional integration.

In this case, the new component is added to the service manual and the previous component remains in the respective chapter.

If the integration of a new component results in changes, the corresponding chapters will be adapted (e. g. removal/installation, preventive maintenance, etc.).

Description of the device

Function and use

The most important component of a cash-out automated teller machine is the Cash Media Dispenser (CMD) or the Vertical Cash Media Dispenser (VCMD), respectively.

The CMD-V4 is the replacement for the AZM-NG. The CMD-V4 and the AZM-NG are software-compatible but not hardware-compatible.

The VCMD is the replacement for the SAT BBA UT. The VCMD and the SAT BBA UT are are software-compatible but not hardware-compatible.

CMD cassettes are upwards and downwards compatible to a limited extent. They are approximately 5 mm longer and thus cannot be installed without modification in the ProCash BBA mini 3K (up to February 2003) and ProCash BBA UT with CEN safe devices. If necessary, a technical modification can be carried out on the ProCash BBA mini 3K. The old cassettes must be deployed with ProCash BBA UT with CEN safe.
In addition, optimized versions of the CMD cassettes have been developed for the VCMD in order to ensure that note dispensing proceeds smoothly from the cassettes in vertical position. These are furnished with a blue cassette lid and are thus unambiguously marked.

The CMD-V4 can also be equipped with banknote-staining cassettes. There are separate manuals available for these.

One printing cassette can also be configured in place of two cassette positions. There is a separate Service module available for this that is integrated in the respective Service manual.

This manual describes the Cash Media Dispenser Version 4 and the VCMD.

In the following are essential features of the Cash Media Dispenser listed:

- High level of functional reliability (low reject rate, double dispenses recognition)
- High level of user-friendliness and maintainability:
  Electrical and mechanical adjustments were minimized
  Maintenance intervals of two years or after 200.000 transactions
- All known requirements of environmentally compatible recycling and disposal were met.

The CMD can be customized in the respective device version to the needs of the users because of the different model versions (Frontload/Rearload) and because of a variable number of dispensing units (up to 6 cash-out cassettes and one reject/retract cassette).

The CMD-V4 consists of the following components depending on the features in the device:

- Stacker with or without single reject
- Serial Number Recognition (optional)
- Output transport horizontal/vertical Rearload/Frontload
- 1-cassette with single dispensing unit
- 4-cassette housing with a double dispensing unit or two double dispensing units
- CMD controller
- Cash-out cassettes (optionally with banknote staining)
- Reject / retract cassette
- Shutter

i The single reject function can only be delivered in countries out of the European Union.

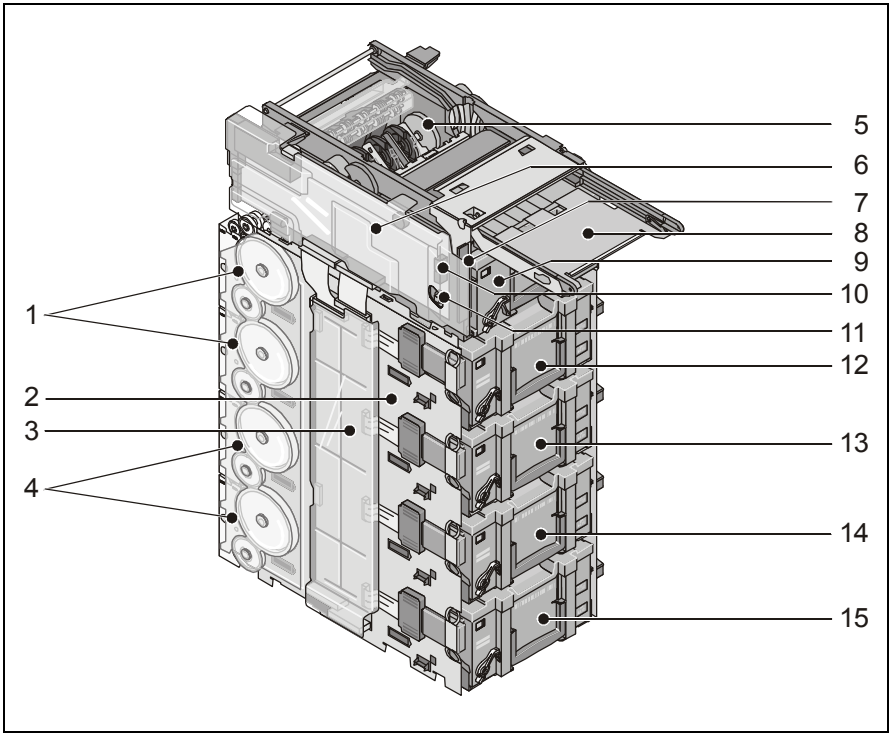
The VCMD consists of the following components depending on the features in the device:

- Stacker and output transport with single reject
- 1-cassette with single dispensing unit
- 2-cassette with double dispensing unit
- CMD controller
- Cash-out and reject cassette

Device Overview and Operation

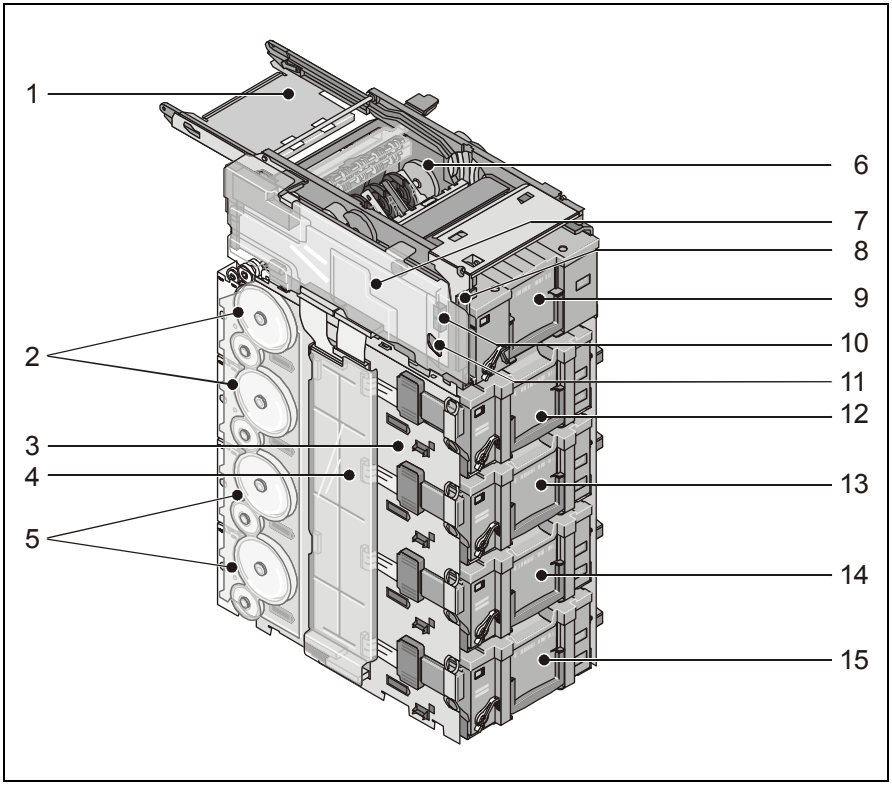
Device overview

CMD-V4 output direction horizontal Frontload



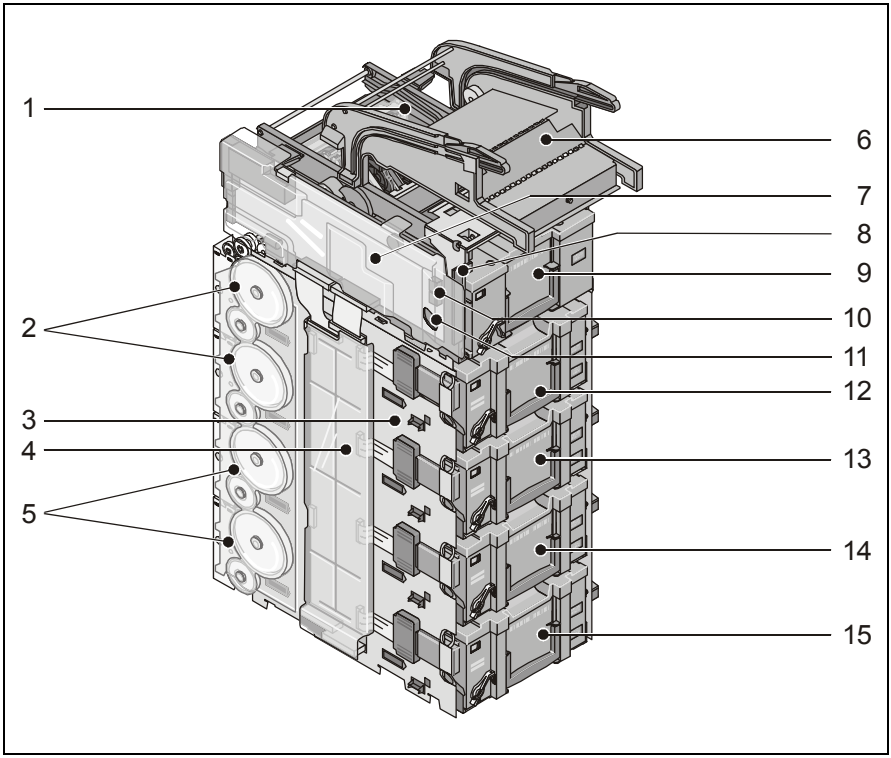
1 Double dispensing unit with DDU
2 Quadruple rack
3 4-cassette distributor board
4 Double dispensing unit
5 Stacker
6 CMD controller
7 Release lever
8 Output transport horizontal FL
9 Reject / retract cassette
10 Status display
11 Function key
12 Cash-out cassette 1
13 Cash-out cassette 2
14 Cash-out cassette 3
15 Cash-out cassette 4

CMD-V4 output direction horizontal Rearload



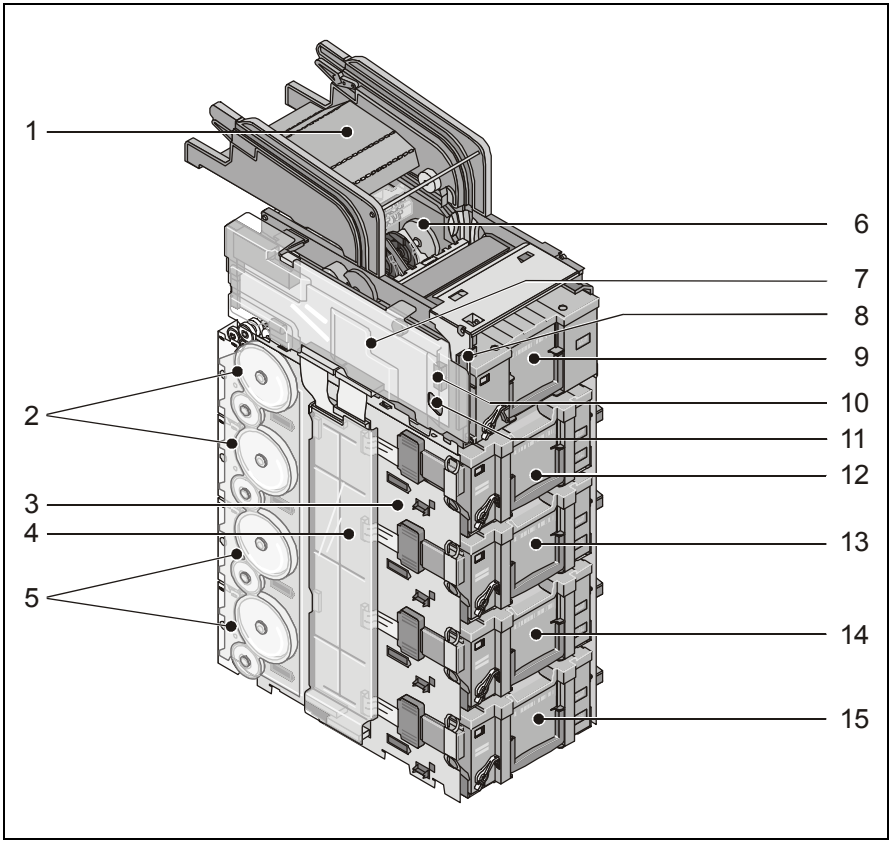
1 Output transport horizontal RL
2 Double dispensing unit with DDU
3 Quadruple rack
4 4-cassette distributor board
5 Double dispensing unit
6 Stacker
7 CMD controller
8 Release lever
9 Reject / retract cassette
10 Status display
11 Function key
12 Cash-out cassette 1
13 Cash-out cassette 2
14 Cash-out cassette 3
15 Cash-out cassette 4

CMD-V4 output direction vertical Frontload



1 Stacker
2 Double dispensing unit with DDU
3 Quadruple rack
4 4-cassette distributor board
5 Double dispensing unit
6 Output transport vertical FL
7 CMD controller
8 Release lever
9 Reject / retract cassette
10 Status display
11 Function key
12 Cash-out cassette 1
13 Cash-out cassette 2
14 Cash-out cassette 3
15 Cash-out cassette 4

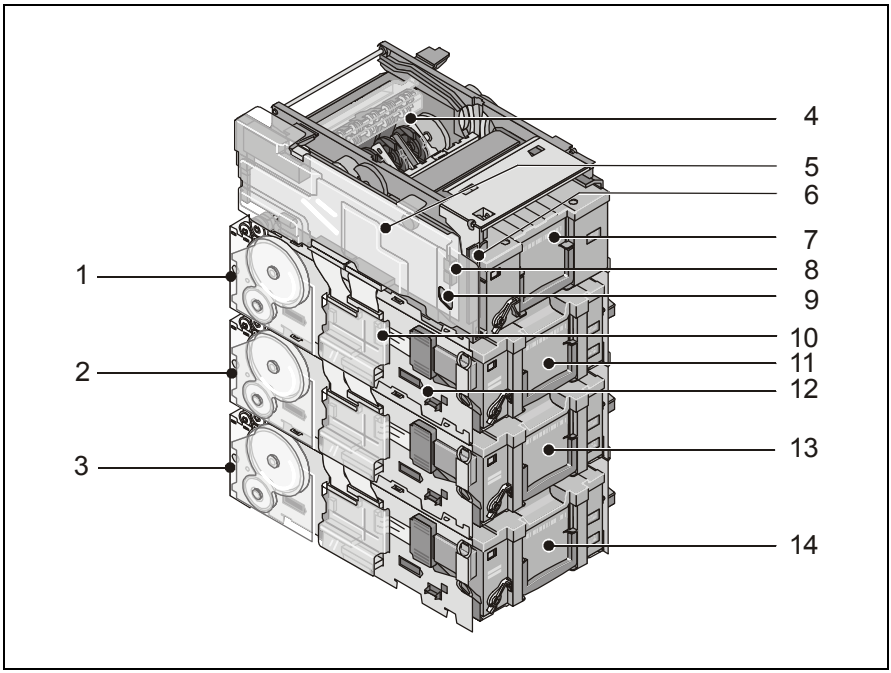
CMD-V4 output direction vertical Rearload



1 Output transport vertical RL
2 Double dispensing unit with DDU
3 Quadruple rack
4 4-cassette distributor board
5 Double dispensing unit
6 Stacker
7 CMD controller
8 Release lever
9 Reject / retract cassette
10 Status display
11 Function key
12 Cash-out cassette 1
13 Cash-out cassette 2
14 Cash-out cassette 3
15 Cash-out cassette 4

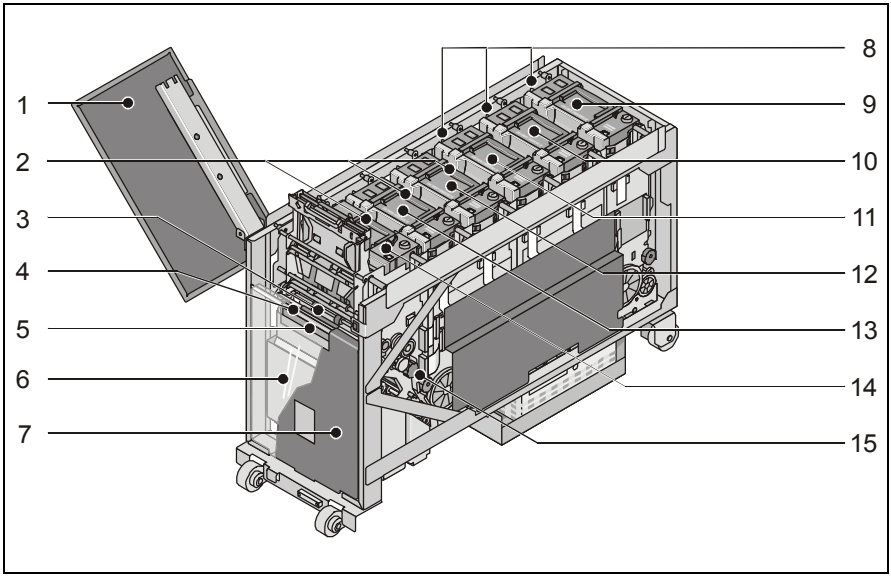
CMD-V4 1-cassette with single dispensing unit

The following illustration shows three 1-cassette housings with a single dispensing unit with double note detection unit (DDU) and two single dispensing units. The CMD-V4 with 1-cassette housing can be supplied in all of the configurations that are also available for the 4-cassette housing (see preceding illustrations).



1 Single dispensing unit with DDU
2 Single dispensing unit
3 Single dispensing unit
4 Stacker
5 CMD controller
6 Release lever
7 Reject / retract cassette
8 Status display
9 Function key
10 1-cassette distributor board
11 Cash-out cassette 1
12 1-cassette housing
13 Cash-out cassette 2
14 Cash-out cassette 3

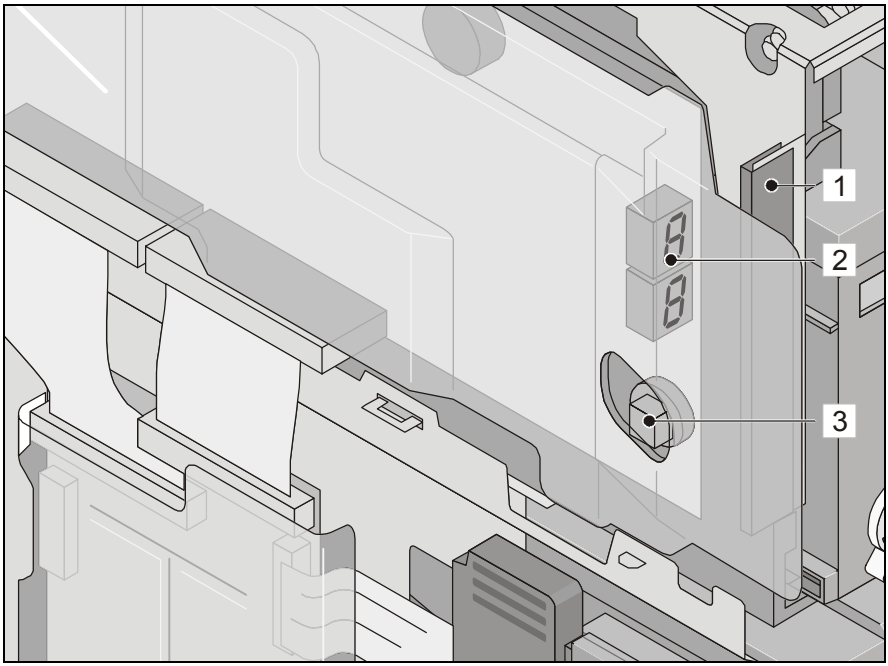
Vertical Cash Media Dispenser (VCMD)



1 Operating unit (folded up to the side)
2 Cassette handle(s)
3 Release handle stacker and output transport (SAT)
4 VCMD handle
5 Locking grip handle SAT
6 Stacker and output transport
7 Safety shield
8 Cassette release tab(s)
9 Cash-out cassette 5
10 Cash-out cassette 4
11 Cash-out cassette 3
12 Cash-out cassette 2
13 Cash-out cassette 1
14 Reject cassette
15 Handwheel (for troubleshooting)

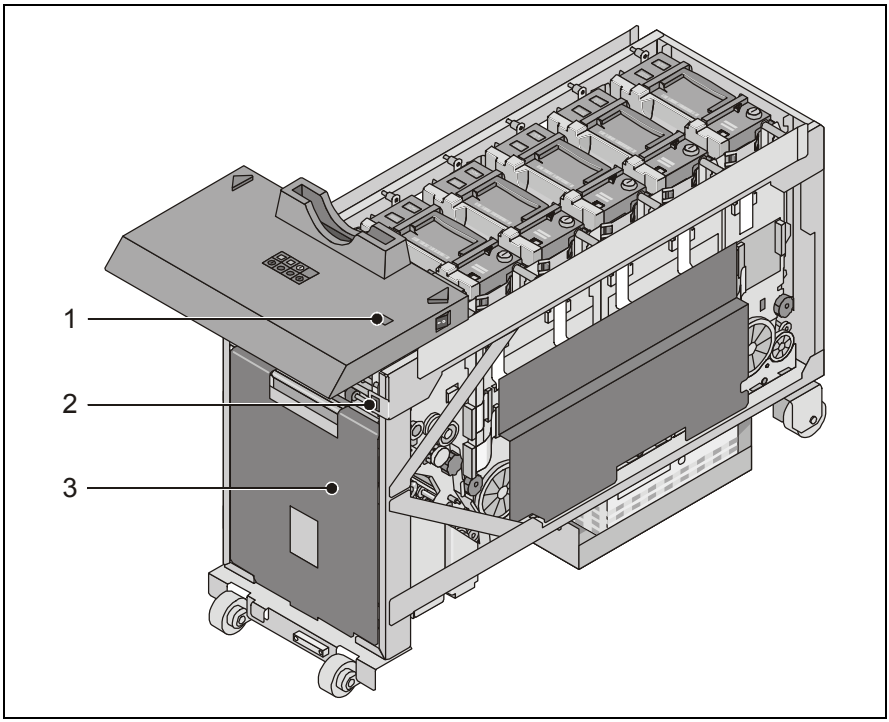
Functional components and controls

CMD-V4



1 Release lever
2 Status indicator (two 7-segment displays, first digit at the top)
3 Function key

VCMD



1 Status indicator (two 7-segment displays)
2 Function key
3 Safety shield

Serial Number Recognition

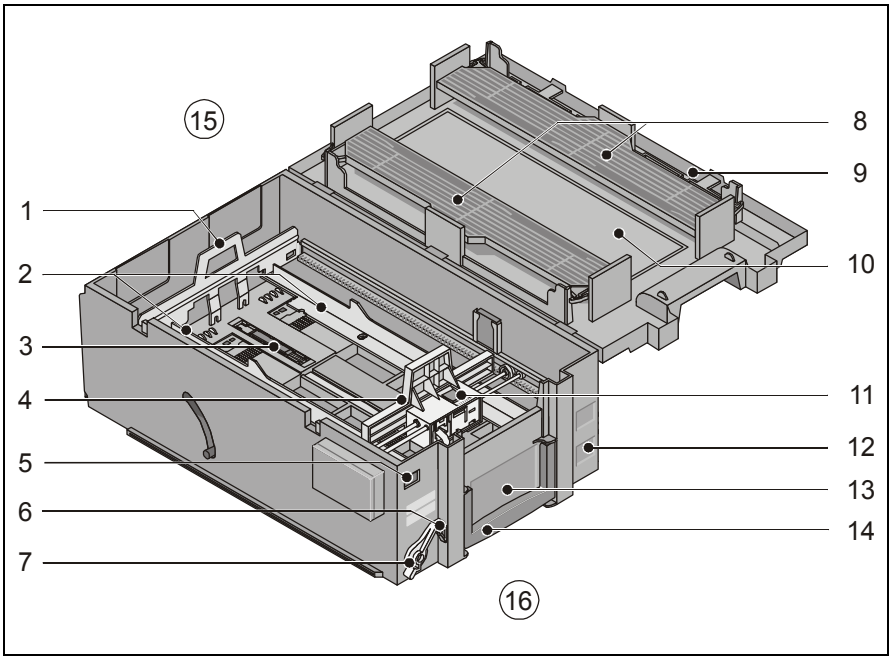
Serial number detection can be optionally configured in the CMD-V4 for specific countries. The bank note is registered by the CMD-V4 and an image of the note is transmitted to the product-specific software. This prepares the data for evaluating the serial numbers on the notes.

The cassettes

Cash-out cassette

The cash-out cassette is used to store banknotes for dispensing. Each cash-out cassette can only store banknotes of the same denomination.
The cash-out cassette is available in different versions.

Cassette versions
Cash-out cassette with locking/release lever and lead-sealed
Cash-out cassette with lock and lead-sealed
Cash-out cassette with locking/release lever and lead-sealed and low cash sensor (see illustration)
Cash-out cassette with lock and lead-sealed and low cash sensor



1 Pull-back handle
2 Banknote rail
3 Slide for low cash sensor (optional)
4 Pressure carriage
5 Blue/green tamper indicator
6 Sealing device
7 Locking / release lever or lock
8 Inset for setting the banknote height
9 Cassette lid
10 Refill notes
11 Latching button
12 Free space for denomination
13 Free space for cassette label
14 Cassette handle
15 Dispensing side
16 Side of cassette handle

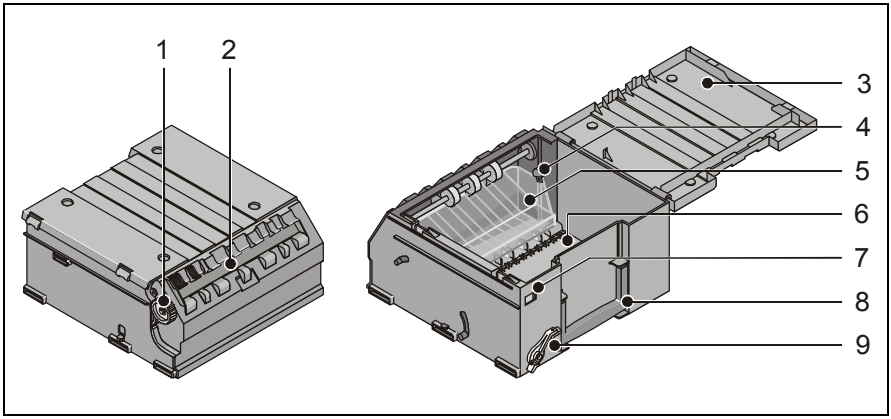
Reject / retract cassette

CMD-V4

Banknotes from failed or trial dispensing are generally stored in an unordered manner in the reject box of the reject/retract cassette.
Banknotes from the customer, e.g. banknotes not removed by the customer, are stored in the retract box of the reject/retract cassette.

The reject/retract cassette is available in different versions.

Cassette versions
Reject/retract cassette with locking/release lever and lead-sealed (see illustration)
Reject/retract cassette with lock and lead-sealed



1 Gearwheel to drive the banknote transport
2 Note input
3 Cassette lid
4 Lever for retract box
5 Retract box
6 Reject compartment
7 Blue/green tamper indicator
8 Cassette handle
9 Locking/release lever or lock

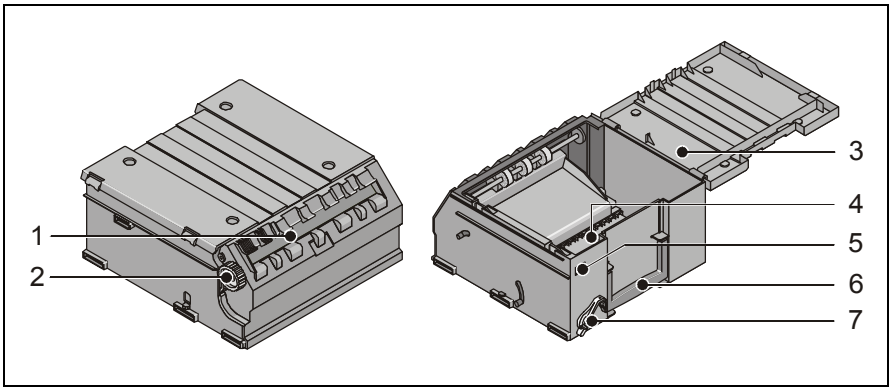
VCMD

i The reject cassette used with the VCMD does not have a retract box.

Banknotes from failed or trial dispensing are generally stored in an unordered manner in the reject box of the reject cassette.

The reject cassette is available in different versions.

Cassette versions
Reject cassette with locking / release lever and lead-sealed (see illustration)
Reject cassette with lock and lead-sealed



1 Note input
2 Gearwheel to drive the banknote transport
3 Cassette lid
4 Reject compartment
5 Blue/green tamper indicator
6 Cassette handle
7 Locking / release lever or lock

Avoidance of problems and damage

Safety instructions

- Make sure that cash-out or reject/retract cassettes are not damaged or dropped during storage and transport.
- In particular, make sure that the gearwheel at the front of the reject/retract cassette is not damaged during storage and transport.
- Protect the cassettes against moisture during transport.
- Do not install cassettes that have come from a cold environment until they have had enough time to acclimatize (condensation, for example, can occur).
- Never pull the cassette out while the system is in operation. This would immediately cause a banknote jam.
- Pay attention to the weight when removing and installing cassettes.
  A completely filled cash-out cassette weighs about 6.3 kg (13.89 lb).

Removing the cassette

CMD-V4

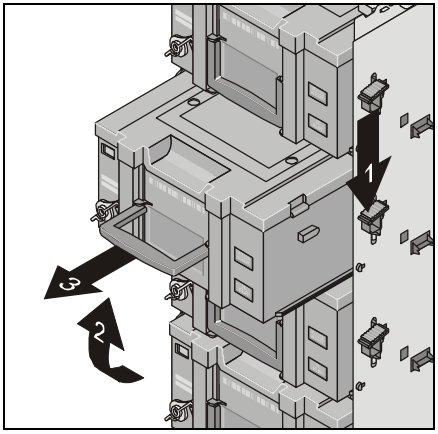
i Before cassettes can be removed, the current transaction must be terminated as defined.

The procedure for removing the reject/retract cassettes and for cash-out cassettes is the same.

Before removing a cash-out cassette always remove the reject / retract cassette first.

- Activate the product-specific software (refer to the operating manual of the basic ProCash device, chapter "Basic Operation", section "Calling the product-specific software").
- Open the safe door (see the operating manual of the base device).

The cassettes from the CMD-V4 can be removed as follows:



Press the green releasing tab on the right side of the cassette (1).

The released cassette is automatically pushed out of the dispenser by several centimeters.

Raise the cassette handle (2) and pull the cassette out of the CMD-V4 by the handle (3). While pulling the cassette, support it from underneath with your free hand.

i When removing cassettes, do not pull them out jerkily so as not to damage them or the box guide.

VCMD

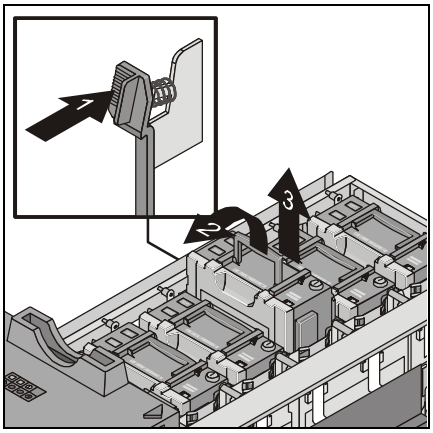
i Before cassettes can be removed, the current transaction must be terminated as defined.

The procedure for removing the reject/retract cassettes and for cash-out cassettes is the same.

Before removing a cash-out cassette always remove the reject / retract cassette first.

- Activate the product-specific software (refer to the operating manual of the basic ProCash device, chapter "Basic Operation", section "Calling the product-specific software").
- Open the safe door and pull the VCMD out of the safe as far as possible (consult the operating manual of the basic device).

The cassettes from the VCMD can be removed as follows:



Press the respective green release tab (1).

The released cassette is automatically pushed out of the dispenser by several centimeters.

Raise the cassette handle (2) and pull the cassette out of the VCMD by the handle (3).

i When removing cassettes, do not pull them out jerkily so as not to damage them or the box guide.

Cassette transportation

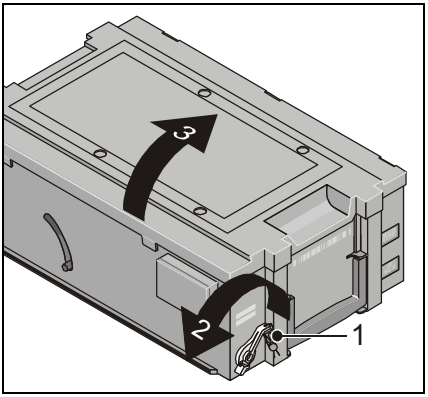
i Make sure that cassette(s) are not damaged during transport. It is therefore important to note the following instructions:

- Do not allow cassette(s) to fall
- Do not toss cassette(s)
- Transport cassette(s) only in its/their original position during transport
- Do not hurtle cassette(s) during transport (loose transport on the loading surface is not permitted)
- Do not stack excessive numbers of cassette(s) on top of one another

Opening the cassette

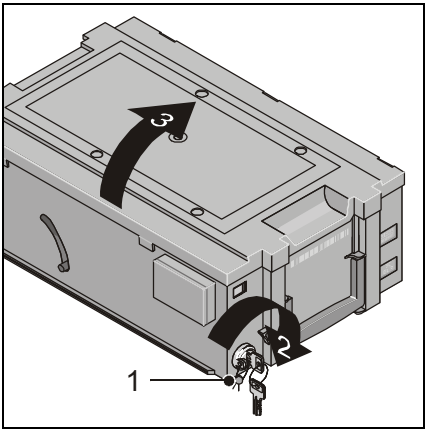
i The procedure for opening cash-out cassettes and reject/retract cassettes is the same.

- Remove the cassette (see section "Removing the cassette").



Cassette without lock

Remove the sealing if there is one (1).
Turn the green locking/release lever in the arrow direction (2) and lift the cassette lid in the arrow direction (3).



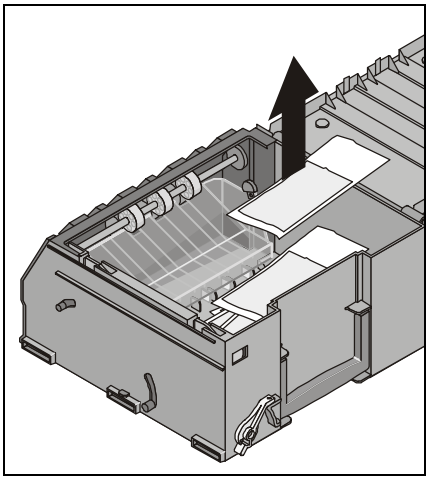
Box with sealable lock

Remove the sealing if there is one (1).
Insert the cassette key into the cassette lock, turn the key to the right as far as possible (2) and lift the cassette lid in the arrow direction (3).

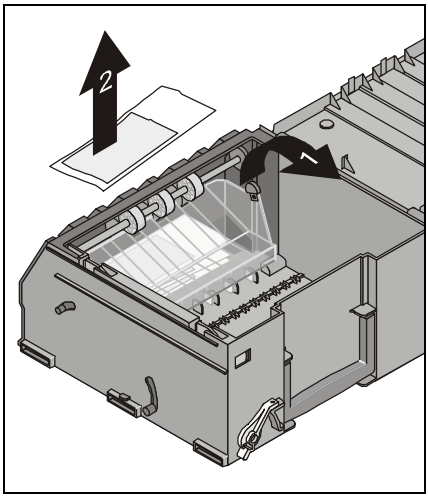
Emptying the reject/retract cassette

CMD-V4

- Remove and open the cassette (see section "Opening the cassette").



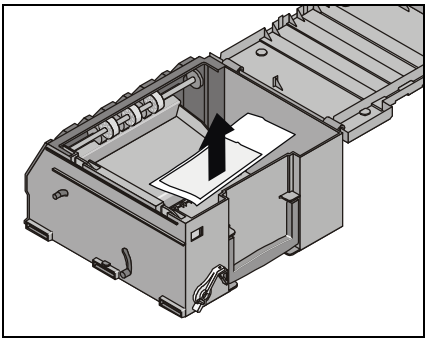
Remove the banknotes from the cassette's reject compartment.



To empty the retract box, push the green lever in the direction indicated (1) as far as possible and hold it down. You can remove the banknotes from the retract box with your other hand (2).

VCMD

- Remove and open the cassette (see section "Opening the cassette").



Remove the banknotes from the cassette's reject compartment.

Setting the low cash sensor

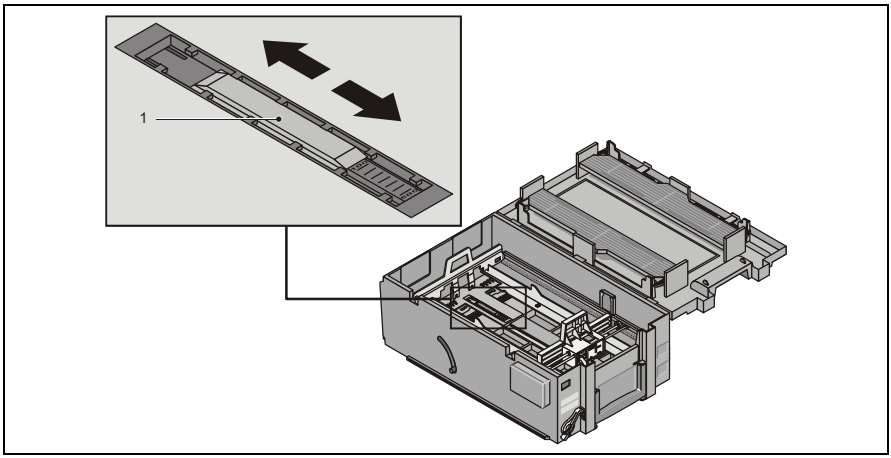
As an option, the cash-out cassettes can be equipped with a low cash sensor.

With this function, a microswitch reports to the connected device that the cassette contains only a certain quantity of banknotes.

To set the sensor to the desired minimum banknote quantity, proceed as follows:

- Remove and open the cassette (see section "Opening the cassette").
- Remove any notes you may find.
- Set the slide (1) manually (see arrows) to the desired minimum banknote quantity.

i The minimum banknote quantity can be set between 50 and 550 (in steps of 50) via the green mechanical slide (1).
Setting '0' means that the function is deactivated.
The example shows the setting for 100 banknotes.

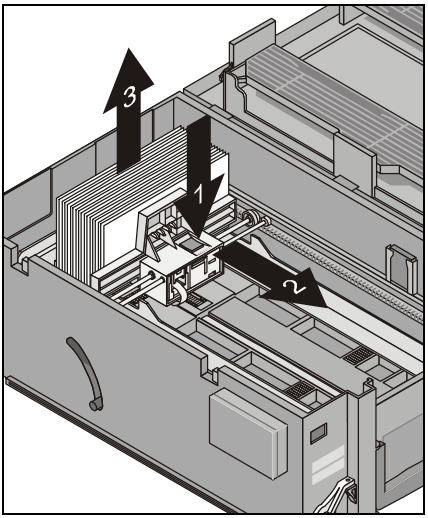


Setting the note width

i The note width has to be set before the cassette is used for the first time or when a different currency or denomination is used in the cassette.

- Remove and open the cassette (see section "Opening the cassette").

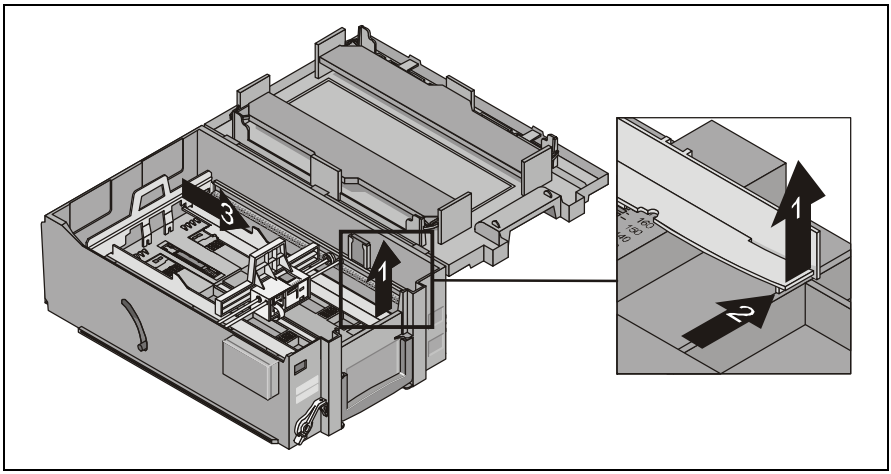
Removing the banknotes



Press the green latching button (1) while sliding the pressure carriage slightly forward at the same time to disengage the return lock.

Slide the pressure carriage up to the center (2). Remove any banknotes present (3).

Disengaging the banknote rails

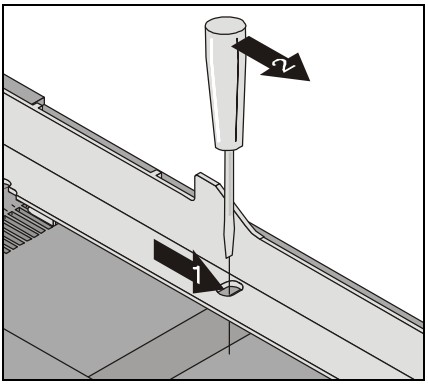


- Pull up the horizontal tab (1) at the end of the banknote rail to lift the catch (2) above the crosspiece underneath the tab. At the same time, push against the shoulder (3) with the thumb of your other hand in the direction of the cassette handle.

i The left rail and the right banknote rails are removed in the same way.

Should the banknote rail be difficult to disengage, proceed as follows:

- Pull up the horizontal tab (1) at the end of the banknote rail to lift the catch (2) above the crosspiece underneath the tab (see illustration in the section "Removing the banknote rails").



Insert the tip of a screwdriver in the opening of the banknote rail (1) and use it as a lever to move the rails in the arrow direction (2).

Disengaging the banknote rail – note width less than 110 mm (4.33")

If the banknote rail is set to a banknote width of less than 110 mm (4.33"), proceed as follows:

- Pull up the horizontal tab (1) at the end of the banknote rail to lift the catch (2) above the crosspiece underneath the tab. At the same time push against the nose of the rail (3) with the thumb of your other hand in the direction of the cassette handle (see section "Removing the banknote rails").

- Push the pressure carriage all the way to the other end of the cassette, i.e. the one from which the banknotes are dispensed.

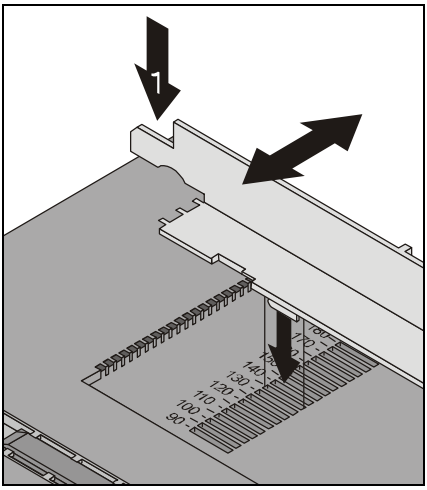
- Lift the end of the banknote rail a little and press it outwards towards the side cover of the cassette. If you hold the rail in this position you can push the pressure carriage to the side of the cassette with the cassette handle.

- Pull the rail on the other side upwards.

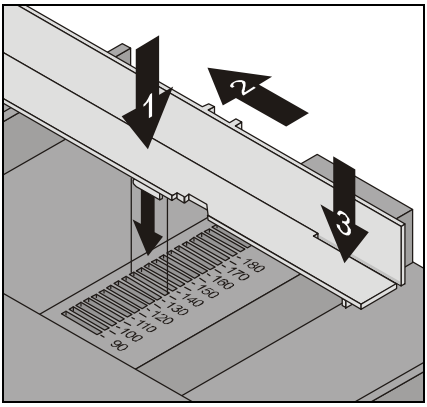
Inserting the banknote rail

i In the following representations, a note width of 133 mm (5.24") is assumed, resulting in a rail setting at 135 mm (5.31") on the scale.

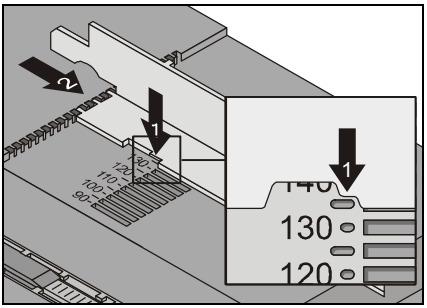
The left rail and the right banknote rails are removed in the same way.



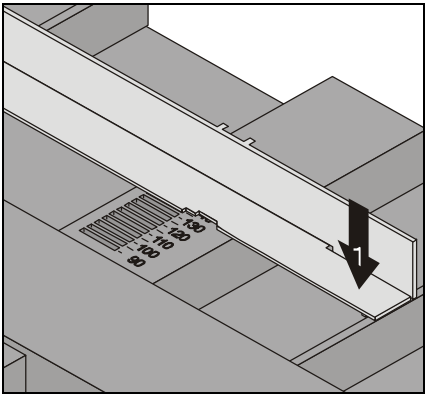
Slide the protruding end of the rail (1) under the lower edge of the pull-back handle if necessary and press the rail (on the dispensing side of the cassette) into the slot for the required banknote width.



Then push the rail into the corresponding slot on the cassette handle side. Press down on the banknote rail (1) near the scale **while pushing it** in the direction of the dispensing side (2). Now push the tab (3) down until it snaps into place.



The banknote rail is correctly inserted if the desired setting is placed in the small cutout (1) and the rail is correctly hooked in (2).

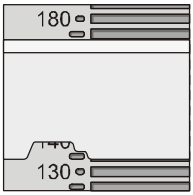
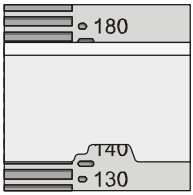
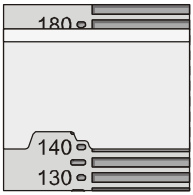
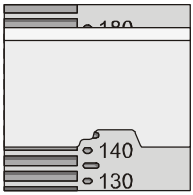


The tab of the rail (1) must lie flat on the crosspiece.

i Make sure that both rails are set to the **same** note width at all four positions.

If you have no information concerning the size of the banknotes used, measure the banknotes in millimeters. Round up this value to the next higher value on the scale and insert the rail at that position.

Examples for setting the banknote rail:

Dispensing end	**Side of cassette handle**	
		Note width 133 mm (5.24") - banknote rail is set to 135 mm (5.31") on the scale
		Note width 137 mm (5.40") - banknote rail is set to 140 mm (5.51") on the scale

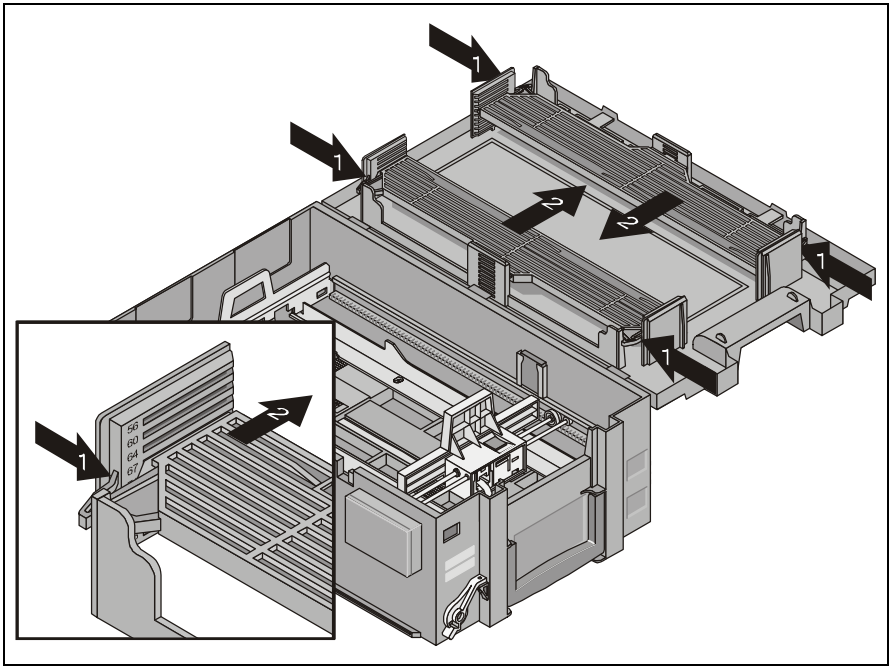
Inserting the banknote rail – note width less than 110 mm (4.33")

If the note width is less than 110 mm (4.33"), please proceed as follows:

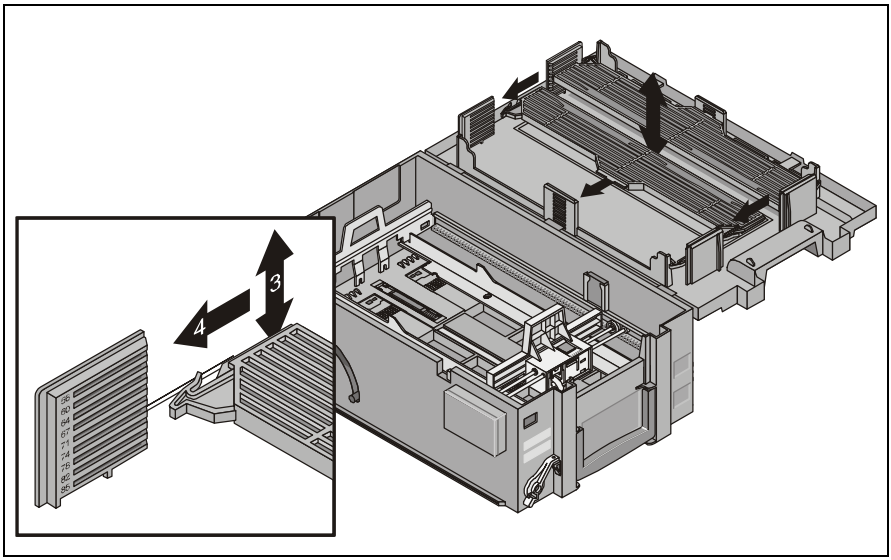
- Push the pressure carriage all the way to the end of the cassette which has the cassette handle (see section "Removing the banknotes").
- Insert the banknote rail in the desired slot in front (dispensing side), and press the rail at the rear (cassette handle end) outwards to the cassette side cover.
- Press the banknote rail down in the center.
- Slide the pressure carriage carefully towards the dispensing side until it reaches the pull-back handle.
- Insert the rail at the rear. Press the tab down until it snaps into place.

i When the banknotes are inserted, there is automatically a gap between the notes and the rails.

Setting the banknote height



- Press the two catches (1) inwards and remove the inset (2) in the direction of the center of the cassette lid.



- Set the required note height (3) and push the insets back in (4) until they snap into place.

i Make sure that the insets are set to the **same** height adjustment at all six positions.

If you have no information concerning the size of the banknotes used, measure the banknotes in millimeters. Round up this value in mm to the next higher value on the scale (CMD-V4) or to the next one higher than that (VCMD) and place the insert in that position.

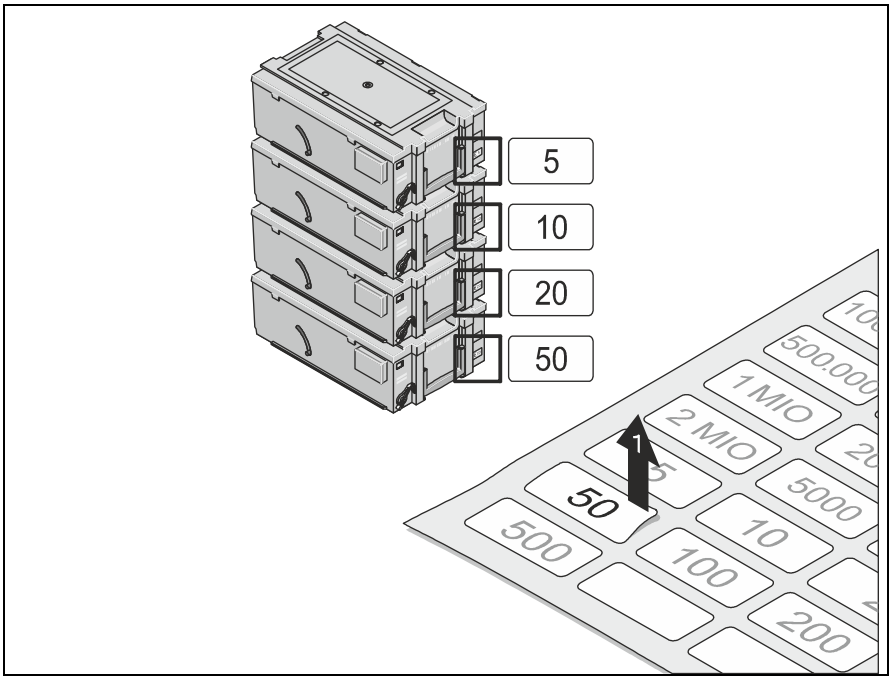
Examples:

CMD-V4:
Note height 72 mm (2.83") - setting the insert at the scale value 74 mm (2.91")

VCMD:
Note height 72 mm (2.83") - setting the insert at the scale value 78 mm (3.07")

Attaching denomination labels to CMD cassettes

i The denomination labels are attached to the cash-out cassette after adjusting the width and height of the note.



- Remove the corresponding denomination labels (1) from the carrier material and attach them to the corresponding cash-out cassette (shown in the illustration here).

Filling the cash-out cassette

Replenishment of the cash-out cassettes includes the following steps:

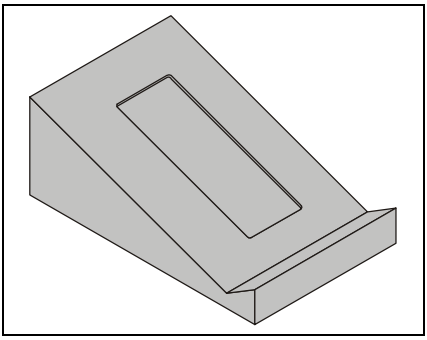
- Preparing the cash-out cassette
- Preparing the banknote bundles
- Inserting banknote bundles

i In general, all banknotes corresponding to the requirements of the national bank are suitable for use in the cash-out cassette.
The cash-out cassette must be positioned horizontally or with the cassette handle side slanted upwards, so that the return lock in the pressure carriage is not activated.

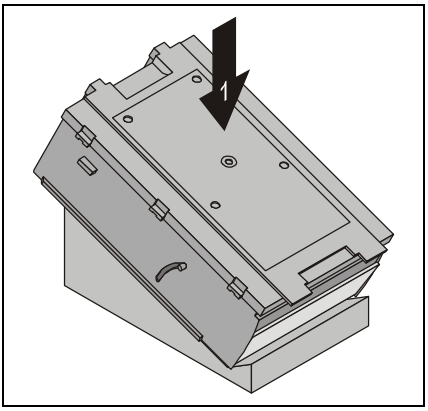
To ensure error-free dispensing, fill the cash-out cassette only with intact and carefully prepared banknote bundles which only contain notes of the same value.

Preparing the cash-out cassette

Use the loading aid shown in the picture below to replenish the cash-out cassette.

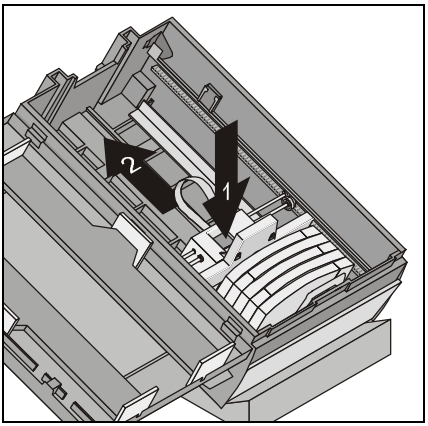


The loading aid facilitates the filling procedure and prevents that the inserted banknotes / banknote bundles fall over.
(Loading aid order number: 7595300720)



Remove the cash-out cassette from the CMD-V4 (see section "Removing the cassette").

Place the cash-out cassette (1) on the loading aid as shown in the picture, and open the cassette lid (see the section "Opening the cassette").



Press the green latching button (1) and push the pressure carriage slightly forward to disengage the return lock.

Then pull the pressure carriage back up to the to cassette edge back towards the side with the cassette handle (2).

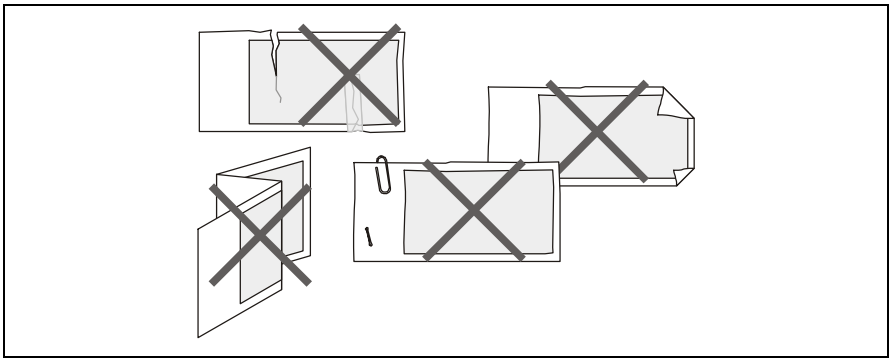
- Set the low cash sensor (if installed) to the desired minimum banknote quantity (see section "Setting the low cash sensor").
- Fill the cash-out cassette. following the instructions provided in the following sections.

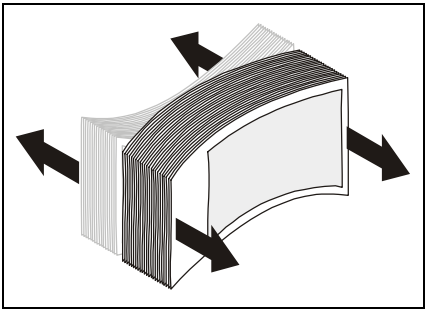
Preparing the banknote bundles

Check the banknotes for damage before you put them into the cash-out cassettes.

Sort out the damaged banknotes and/or remove clips, needles or other foreign objects.

i The following banknotes should be rejected: torn, glued, folded, creased, stapled or clipped banknotes.



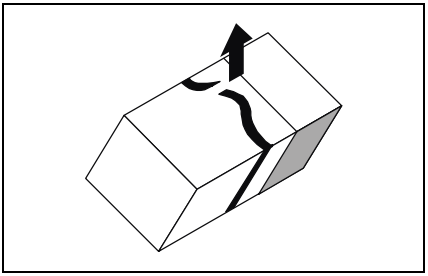


If you use new banknotes/banknote bundles, you must separate the banknotes at the cut edges. Carefully fan the banknote bundles and bend them several times in various directions.

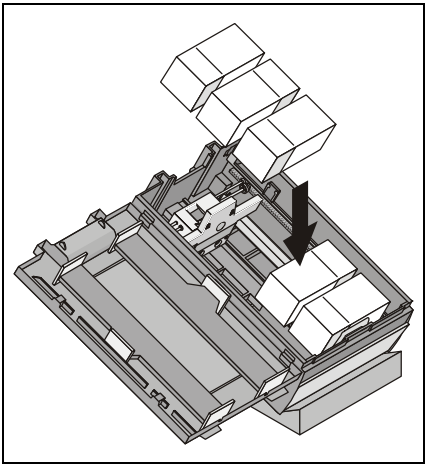
Inserting banknote bundles

i Also follow the instructions for filling the cash-out cassette on the inside of the cassette lid.

General refill notes

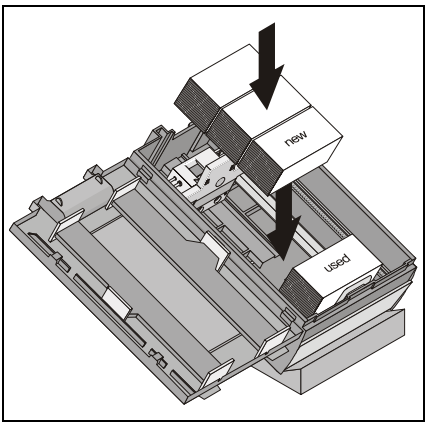


Remove any existing bank wrappers made of paper, plastic or rubber before inserting the banknote bundle.



You should always insert the banknote bundles into the cash-out cassette so that the silver strips or other raised embossing of the individual bundles are alternately pointing to the left and to the right.

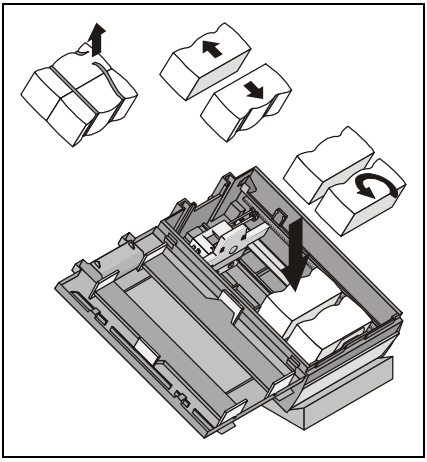
New and used banknote bundles



If you use new and used banknote bundles in one cassette, always insert the bundles with the used banknotes into the cassette first.

Then insert the bundles with the new banknotes after you separated them at the cut edges (see the section "Preparing the banknote bundles").

Deformed banknote bundles

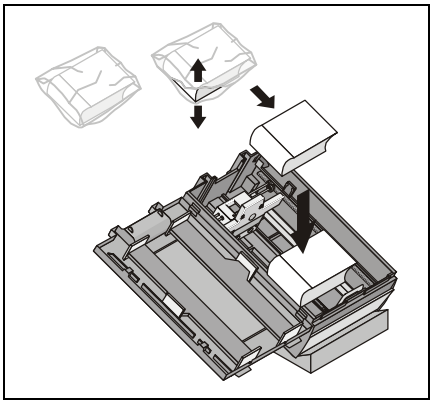


Insert banknote bundles which were deformed by packaging (bands with paper, plastic or elastic bands) as follows:

Split the banknote bundle and turn the first half of the bundle so that the bent side is pointing towards the pressure carriage.

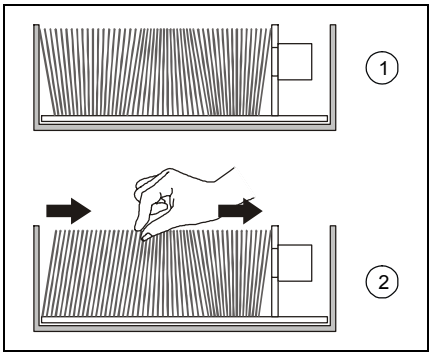
Insert the two bundle halves into the cassette as shown in this picture.

Please do not use any extremely deformed banknotes.



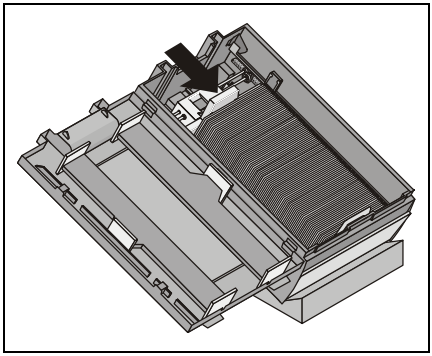
Always insert banknote bundles which are bent horizontally by their packaging into the cash-out cassette in such a way that the side of the bundle bulging out is pointing towards the pressure carriage.

Remove the banknote bundles from the packaging, fan the banknotes and put them into the cassette as shown in the picture.



The banknotes are now positioned in the cash-out cassette as shown in the illustration (1).

Stroke across the banknotes towards the pressure carriage as shown in the illustration (2).



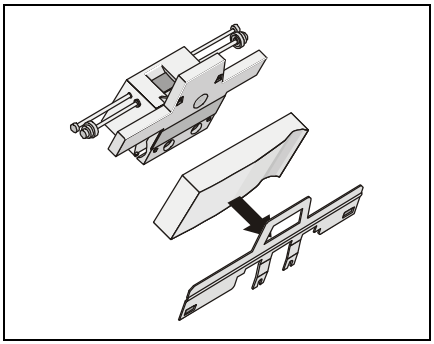
Press the green latching button on the pressure carriage, and push the carriage against the banknotes far enough to prevent them from falling over. The inserted banknotes do not need to be pressed together.

- Close the cash-out cassette and re-insert it (see section "Inserting the cassette").

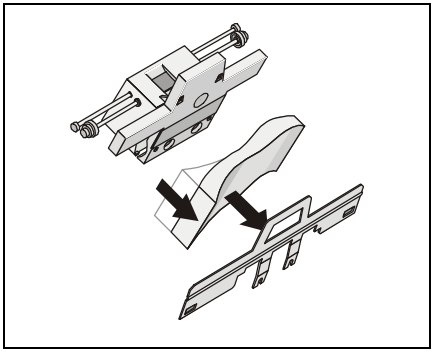
Special comments for deformed banknotes

Possible deformation of banknotes

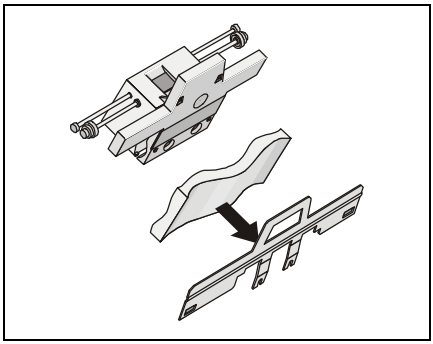
Type A: Bulge near the hologram	**Type B:** S-shaped bulge	**Type C:** Wavy-shaped bulge
		



Type A:
Turn the bundle so that the deformed corner of the banknote is pointing towards the dispensing side and not towards the pressure carriage.



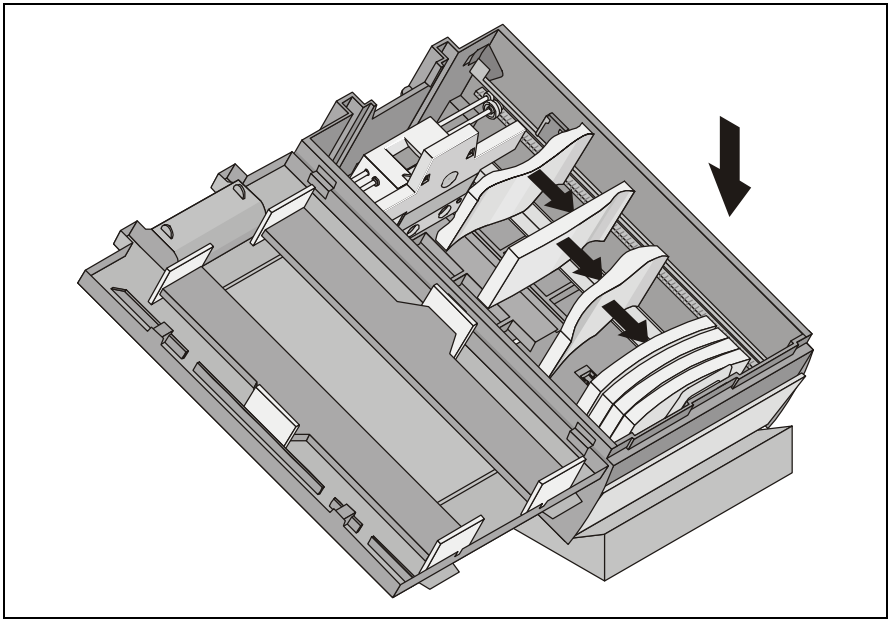
Type B:
Bundles whose S shape is pronounced and exceeds 5 mm (0.2") should not be deployed. If no other banknote bundles are available, the entire bundle needs to be formed to a U shape as to be fit for use. Insert these bundles so that the deformed corners are pointing towards the cassette end from which the banknotes are dispensed and not towards the pressure carriage.



Type C:
If the bundle has a wavy shape as a result of being tied, turn it so that the deformed corners are pointing towards the end from which the banknotes are dispensed and not towards the pressure carriage.

The following illustration shows the sequence in which the deformed banknotes have to be inserted.

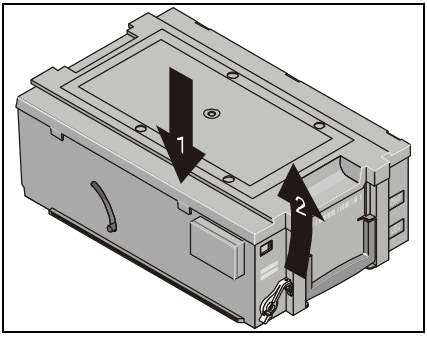
Note that the deformed corners of the banknotes must always point to the side from which the notes are dispensed. The bulging side always has to point to the pressure carriage/cassette handle side.



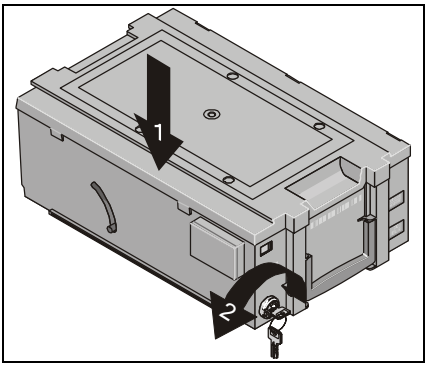
Inserting the cassette

i The procedure for inserting cash-out cassettes and reject/retract cassettes is the same.

Closing the cassette



If the cassette does not have a lock, you must close the cassette lid (1) and turn the green locking and release lever (2) to the left. The cassette lid then engages in the latching mechanism, and the lever (2) automatically returns to its original position.



If the cassette has a lock, close the cassette lid (1) and turn the key (2) to the left as far as possible. Pull the key from the cassette lock.

- Seal the cassette if necessary.

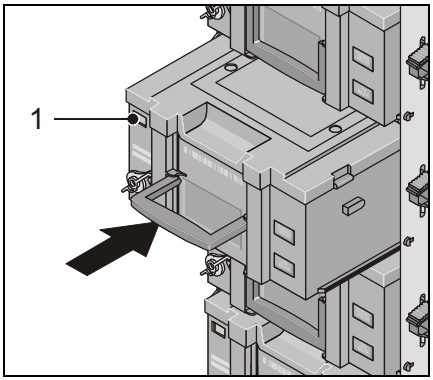
Inserting the cassette

CMD-V4

i Normally the tamper indicator (1) is always green. If the indicator is blue, the cassette has been tampered with or has been forced open.

To switch the tamper indicator to green, proceed as follows:

- Unlock the cassette using the key and/or turn the locking/release lever to the left.
- Turn the locking/release lever to the left or lock the cassette with the key (see section "Closing the cassette").



Push the cassette back into the CMD-V4 in one uninterrupted motion until it audibly latches into place. Wait for the single beep confirming the correct pressure build-up in the cassette.

i When installing cassettes, do not push them in jerkily so as not to damage them or the guide.

- If a triple signal tone sounds instead of a single tone, remove the cassette and check the contents of the cash-out cassette (see the instructions in the section "Filling the cash-out cassette"). Then try again to insert the cassette.

The acoustic warning (triple signal tone) is accompanied by a message on the status display of the controller (ZAC).

Example:

4

8 - Cash-out cassette 1

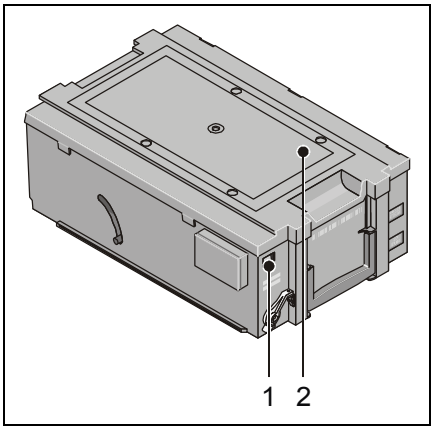
VCMD

i Only cassettes with a blue cover are suitable for the vertical operation of the VCMD.

i Normally the tamper indicator (1) is always green. If the indicator is blue, the cassette has been tampered with or has been forced open.

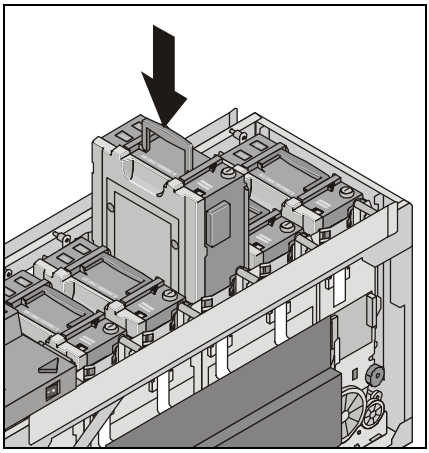
To switch the tamper indicator to green, proceed as follows:

- Unlock the cassette using the key and/or turn the locking/release lever to the left. Open the lid (see section "Opening the cassette").
- Close the cassette lid and turn the locking/release lever to the left or lock the cassette with the key (see section "Closing the cassette").



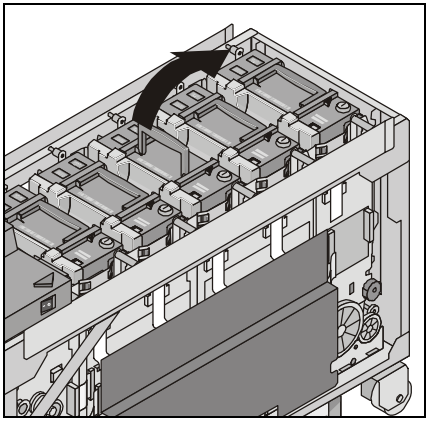
Check the cassette before using it.

1 The tamper indicator must indicate 'green'
2 Cassette with a blue cassette lid

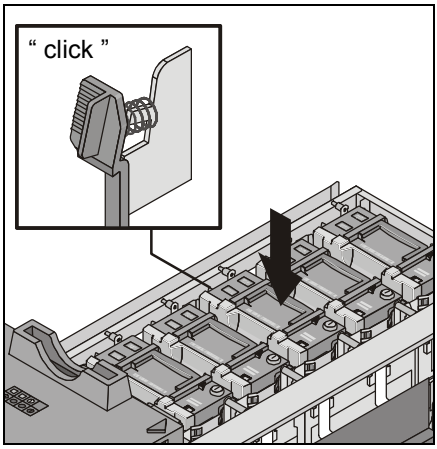


Holding the cassette grip, insert the cassette slowly and evenly into the VCMD (see arrow).

i Do not jerk the cassette while inserting it and never permit it to fall into the VCMD from above!



Fold the cassette grip down in the arrow direction.



Press the cassette downward with the flat of your hand (see arrow) until the locking/unlocking key engages audibly.

- If a triple signal tone sounds instead of a single tone, remove the cassette and check the contents of the cash-out cassette (see the instructions in the section "Filling the cash-out cassette"). Then try again to insert the cassette.

The acoustic warning (triple signal tone) is accompanied by a message on the status display of the controller (ZAC).

Example:



- Cash-out cassette 1

Cassette initialization

The initialization of the cassettes is necessary in case of new types of banknotes or cassettes. With the initialization the system will be informed about the cassette number, the currency and the denomination of the banknotes. If necessary, you can enter more parameters.

Please observe the product-specific and bank requirements concerning a standard or individual change of cassettes. Please obtain this information from the bank's administration.

Determining the reference value

The reference value determination can be performed for a maximum of 40 different unknown banknotes. It is controlled by the product-specific software.

The reference value determination is required for:
- Initial start-up,
- Use of new banknote types,
- Replacement of controller or dispensing unit with measurement point.

- Activate the product-specific software (refer to the operating manual of the basic ProCash device, chapter "Basic Operation", section "Calling the product-specific software").

From the specified cassette the currency characteristics, the value of the banknotes and the release date will be read out. These values are transmitted to the cassette beforehand when it is initialized. There will be as many banknotes dispensed as necessary for reference value determination. The process of determining the reference value will be terminated at the latest if the reference value cannot be determined within the maximum possible number of banknotes. The cassette status remains at <P> in this case.
After the reference value has been determined, the dispensed number of banknotes is reported back to the system.
If no reference value is determined, the status <P> is reported back to the software. No dispensing from this cassette is possible under these circumstances.

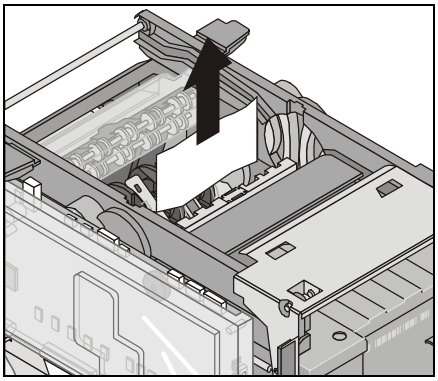
The dispensed banknotes are located in the stacking position in the clamp.

- Open the safe door (see the operating manual of the base device).

CMD-V4

- Pull the CMD-V4 as far as possible out of the safe by the green release lever (see chapter "Removal and installation", section "Pulling out/pushing in the CMD-V4").

i If the release lever jams and you cannot pull out the CMD-V4, it is imperative that you consult the chapter "Troubleshooting".



Remove the dispensed banknotes from the clamp stacking position and count them.

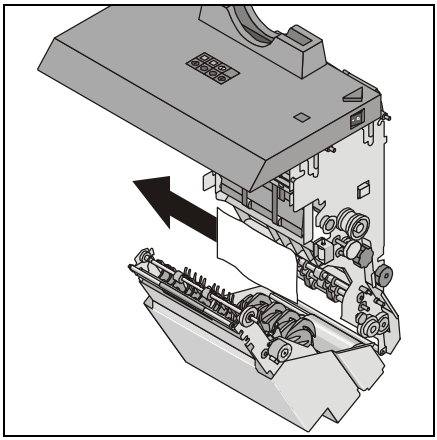
The quantity of dispensed banknotes must be the same as the one indicated by the system. If this is not the case, you will have to repeat the whole procedure for determining the reference values.

Place the counted banknotes in the clamp stacking position.

- Slide the CMD-V4 as far as possible into the safe.
- Wait until the CMD-V4 is ready.
- After the CMD-V4 has powered up, the cash in the stacking position is transported to the reject/retract cassette.
- Select the next cash-out cassettes for the reference value determination using the product-specific software or quit the function.
- Close the safe door (see the description in the basic device operating manual).

VCMD

- Pull the VCMD out of the safe as far as possible (consult the operating manual of the basic device).



Open the stacking compartment, remove the banknotes from the clamp stacking position and count them.

The quantity of dispensed banknotes must be the same as the one reported by the product-specific software. If this is not the case, you will have to repeat the whole procedure for reference value determination.

Place the counted banknotes back in the clamp stacking position.

- Slide the VCMD into the device as far as possible.
- Wait until the VCMD is ready.
- After the VCMD has powered up, the bank notes in the stacking position are transported to the reject cassette.
- Select the next cash-out cassettes for the reference value determination using the product-specific software or quit the function.
- Close the safe door (see the description in the basic device operating manual).

Function test

CMD-V4

Press the function pushbutton on the CMD controller (see also the section "Functional components and controls") to start test runs and to reset the CMD-V4. To start a test function, the CMD-V4 must be in normal operating mode. '00' or '14' is then shown on the status display.

When you press and hold the function key, '00', '1', '2', '3', '4', '5' and '6' are displayed in sequence on the status display. What these numbers mean is described in the following table. To start a particular sequence, release the key when the status display shows the relevant value.

i The functions described in the following sections can be performed only when the safety switch is closed (i.e. the CMD-V4 is in cash-out position). Functions '2' and '3' may be started only from normal operation (display '00' or '14') or when all transport paths are guaranteed to be clear.

VCMD

Press the function button on the VCMD controller (see also the section "Functional components and controls") to start test runs and to reset the VCMD. To start a test function, the VCMD must be in normal mode. '00' is then shown on the status display.

When you press and hold the function key, '00', '1', '2', '3', '4' and '5' are shown on the status display. What these numbers mean is described in the following table. To start a particular sequence, release the key when the status display shows the relevant value.

i The functions described in the following sections can be performed only when the safety switch is closed (i.e. the VCMD is in cash-out position). Functions '2' and '3' may be started only from normal mode (display '00') or when all transport routes are guaranteed to be clear.

General

Display	Function	Description of the function
00	Normal mode	Return to normal mode (not a function).
01	Reset	The CMD-V4 or VCMD is powered up while '—' is displayed on the status indicator (for approx. 10 seconds). If an error is detected which prevents or endangers the operability of the CMD-V4 or VCMD (soiled photosensors), the relevant error or a warning is displayed on the status display. This test function is identical to the power-up test when the CMD-V4 or VCMD is pushed into the dispensing position (closing the safety switch).
02	Overall test + RESET	In this test all mechanical CMD-V4 or VCMD components are operated one after the other. If an error is detected, it is displayed on the status display. The lifting magnets for the single reject switch and retaining shafts and the electromagnetic clutch can only be subjected to a visual function check in this case. If no errors are detected during the test, a RESET is subsequently carried out.

Display	Function	Description of the function
03	Test dispensing + RESET	Standard command set: With this test the banknote paths and the dispensing function of all inserted and filled cassettes are checked: First, one banknote each is extracted from all of the cassettes and transported to the reject compartment during the subsequent reset that takes place automatically. If an error occurs, it is displayed on the status display. If no errors are detected during the function, a RESET is then carried out. <nACT> is modified; <nNDV> remains unchanged.
04	FW version	The version number is displayed in alternating mode. Example: From the firmware ID (read with DIL) MOD 061203 1137 CMD_V4_0.BIN version number **1137** is displayed as follows: **11** for 1 second **37** for 1 second dark for 1 second **After nine attempts, the device returns to normal mode.**
05	Clear statistics counter	The resettable counters are reset to 0 and the current date of the real time clock is saved.
06	Deactivation of encryption	If the safe door is open and DES_CLEAR_BUTTON=Y, then the encryption between the CMD-V4 and the system unit (PC) is deactivated.

Description of the Components

Memory chip (EEPROM)

In order to ensure the highest level of compatibility between the individual hardware components and the firmware, the relevant components have been equipped with an EEPROM that contains information about the mechanical (FCKM) and electronic (FCKE) hardware variant. These are physically mounted to the respective component.

If the single hardware or firmware levels are incompatible, the CMD controller reports that to the product-specific software. The software decides if a firmware update or a hardware replacement is necessary.

Cassette handling

All cassette positions are checked cyclically for changes with the help of the respective pressure sensor.

If a new cassette was inserted, the dispensing pressure should be builded after that. If the dispensing pressure is not possible, you can hear an acoustic signal three times. Status code <4x> is displayed.

After this, the data of the cassette memory is read.

The following data is stored in the cassette:

- Cassette ID
  The 7-digit value contains the serial number of the cassette if it gets delivered. It can be set customer-specific by the system.
- Currency characteristic
  This is a 3-digit currency characteristic acc. to ISO 4217 (codes for representation of currencies and funds) e.g. EUR.
- Release date
  The release date of the bank notes contains an additional 4-digit ID (YYMM of the edition). This allows the CMD-V4 or VCMD to process notes with the same nominal value but different note properties.
- Denomination
  This value determines the denomination of the bank note (8-digit).

After cassettes were replaced, the new cassettes need to be confirmed by the system software. If this is not happened, the dispensing commands for the corresponding cassette positions will be rejected (the state of the cassette remains 'new inserted').

The status code <14> (Minimum configuration is missing) will be displayed unless at least one cash-out cassette and the reject cassette have been reported by the system after a replacement.

The CMD controller or VCMD controller



The controller used with the CMD-V4 (Cash Media Dispensers) is identical to that of the VCMD (Vertical Cash Media Dispensers) and will be referred to henceforth in the text as 'CMD controller'.

The CMD controller is equipped with the microprocessor 80C188 and controls the communication with the higher-order system unit as well as connected modules of the CMD-V4 or VCMD.

The data transfer between system unit and CMD-V4 or VCMD takes place either via USB or RS232C interface. The transfer parameters for the RS232C interface are determined automatically. In exceptional cases, the standard line parameters (19200,8,2,ODD) can be set using jumpers.
The USB interface behaves in full conformance with USB 1.1 Full-Speed.

RS232C interface (CMD controller 01750055781)

The process control receives the control commands from the higher-order system unit through the RS232C interface and confirms and checks the commands. If the command is approved, the program controls the mechanical device functions. Afterwards, the higher-order system unit is issued the command acknowledgement.

USB interface (CMD controller 01750074210 / 01750105679)

The short package mode is used for flow control. The national USB chip that is used supports a maximum FIFO depth of 64 bytes. If more than 64 bytes are to be transferred to or from the CMD-V4 or VCMD, the data is split into 64-byte blocks and sent separately. Any packet that contains less than 64 bytes of data is known as a short package. Only when a short package is received is the receive buffer with the receive data returned to the caller.

If the USB cable is connected to the CMD controller and enumeration has been executed with the PC host, commands can subsequently only be sent and received via USB.

After disconnecting the USB cable from the CMD controller or deactivating the PC host, the system switches back to V24, i.e. USB has higher priority than V24.

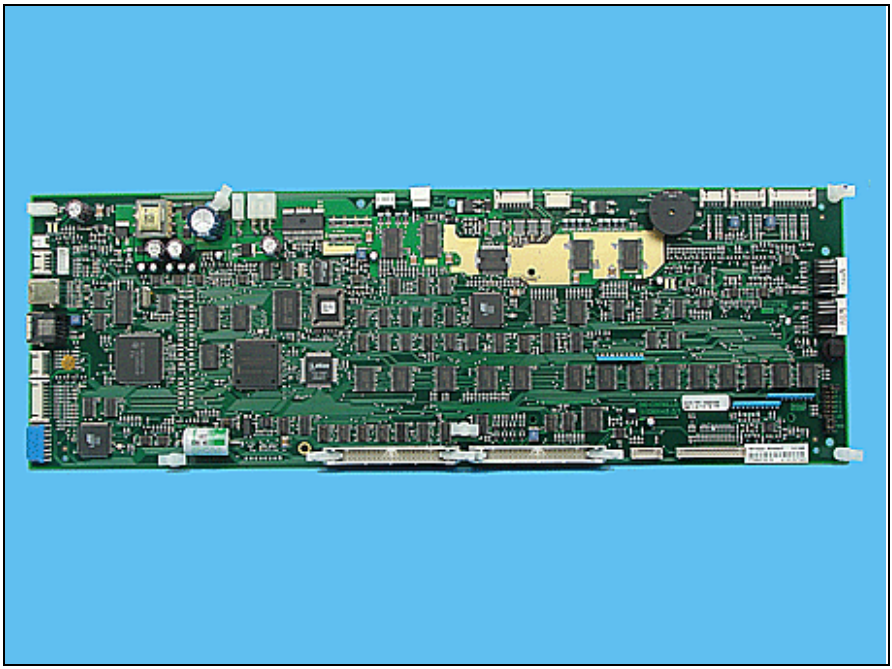
In addition to the normal job channel, there is also a debug channel, which communicates warnings and error messages from the firmware to the PC host. The debug channel is immediately activated during device enumeration (CMD-V4 or VCMD). The PC application can optionally evaluate the debug channel. The debug channel is not a service channel, i.e. it cannot be used to send data to the device.

The CMD-V4 or VCMD behaves as described in the USB specification [1] for full-speed devices.

The host (PC) is always the initiator of a transaction, i.e. the device (CMD-V4 or VCMD) will always only respond to queries from the host and never launch a transaction itself.

The controller is comprised of the following components:

Function group	**Components**
80C188 CPU with 20 MHz	Execution Unit Programmable Interrupt Controller Counter Timer Controller DMA Unit Chip Select Unit Bus Interfaces Unit
Memory	512 Kbyte static data RAM 512 KByte Flash-PROM (PUT/bootstrap loader)
DUART 16C552	



The above image shows the component side of the CMD controller without cover. The CMD controller controls all of the processes in the CMD-V4 or VCMD and the communication to the higher-order system unit.

The following functions are integrated on the CMD controller:

- Measurement of banknotes
- Photosensor control
- Motor control and module supervision for up to two double dispensing units and two single dispensing units.
- Cassette control

Firmware

The loadable firmware CMD_V4_0.bin is stored in a Flash-PROM. In standard mode, it is outwardly AZM-NG-compatible.

A USB-capable KDIAG is required for updating the firmware through the USB interface. In principle, updating also continues to be possible through the serial interface (insofar as the corresponding socket is available), but the USB plug must however be pulled from the controller in order to do this.



The number of dispensing units is detected automatically by the connected distributor board.

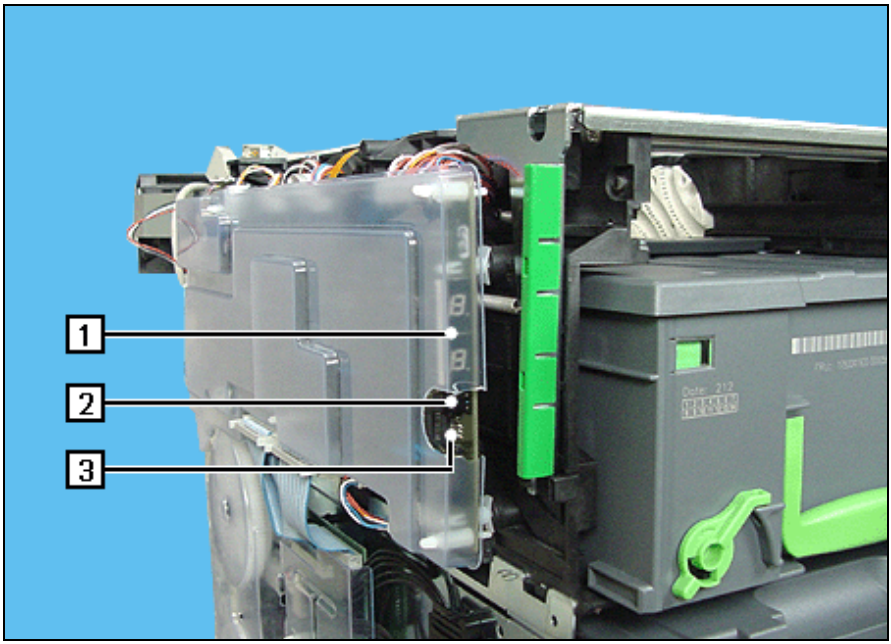
Exception: Quadruple distributor board on the 4-cassette housing equipped with only one double dispensing unit. This configuration must be configured per jumper.

The CMD controller is subdivided into the following function blocks:

- Control block
- I/O block with motor control
- Photosensor logic board
- Thickness message logic board
- Components control
- Serial interface

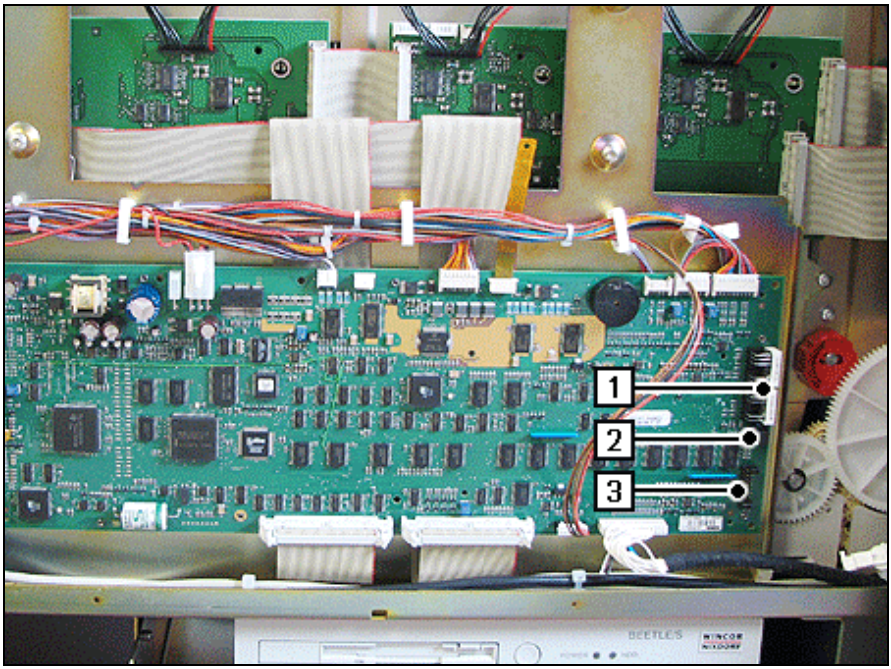
Position of the function groups

CMD-V4



1 Two 7-segment displays
2 Function key
3 Jumper field

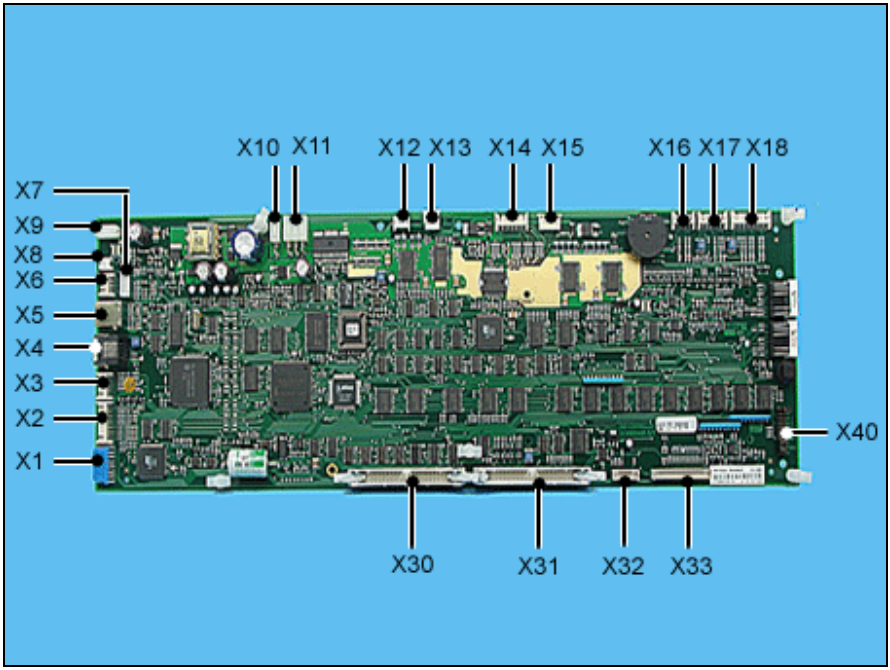
VCMD



1 Two 7-segment displays *
2 Function key *
3 Jumper field

* The display or the buttons can also be led through to the outside.

Connector arrangement on the CMD controller



Connector	Description
X1	Mechanical thickness sensor
X2	Shutter
X3	Transport module
X4	V.24 interface on the PC
X5	USB interface on the PC
X6	Door switch and security switch in the safe
X7	V.24 interface
X8	Special electronics module
X9	24 V voltage supply
X10	V.24 connection
X11	Motor M1
X12	Additional motor on the main drive component for Single Reject (optional)

Connector	Description
X13	Clamp motors
X14	Motor and lift magnets on the stacker / left and right side cover
X15	EEPROM on the stacker
X16	Hall sensors on the stacker
X17	Hybrid photosensors and photosensors on the Single Reject
X18	Hybrid photosensors and photosensors on the stacker / left side cover
X30	Dispensing unit
X31	Dispensing unit
X32	Hybrid photosensors and photosensors on the stacker / right side cover
X33	Position switches and extensions
X40	Jumpers

In the chapter "Pin assignment", the assignment of the pins are listed.

Logical interface

All of the commands from the higher-order system to the CMD or VCMD and answers from the CMD or VCMD to the higher-order system follow the master-slave principle. This means that the CMD or the VCMD does not send any spontaneous messages.

A command is always executed in its entirety by the CMD or VCMD and then acknowledged. If additional commands are transmitted during this time, then they will be rejected by the CMD or VCMD.

Command from higher-order system

Length	Content	ERROR
1	D	Device ID (Dispenser) (ASCII)
1	a	Command specification (ASCII)
1	a	Additional specification to the command (ASCII)
n	XX ... XX	or data if necessary (ASCII / HEXA)

Acknowledgement from CMD

Length	Content	ERROR
1	D	Device ID (Dispenser) (ASCII)
1	a	Command specification (ASCII)
1	a	Additional specification to the command (ASCII)
1	a	Status code (ASCII)
n	XX ... XX	or data if necessary (ASCII / HEXA)

Command overview

Command	Description
DAblank	Reset / Power up
DAB	Clearing
DBC	Dispense Additional
DBS	Dispense Standard
DCA	Transport: Wait for cash removal

Command	Description
DCB	Transport: Bundle Reject
DCC	Transport: Close shutter
DCE	Transport: Output cash
DCO	Transport: Open shutter
DCP	Transport: Offer cash
DCQ	Transport: Cash retract without storage
DCR	Transport: Cash retract with storage
DCT	Transport: Shutter Test
DCW	Transport: Target = Stop Over
DDblank	Cancel
DEC	Cassette status
DED	Device status
DEF	Properties
DEK	Reading firmware configuration
DFA	Confirm number of notes
DFB	Confirm no. of notes (without errors)
DFC	Confirm existing cassettes
DFD	Note parameter II
DFG	Write firmware configuration
DFI	Cassette ID (Standard)
DFL	Set minimum quantity
DFN	Number of notes
DFO	Number of notes (without check)
DFP	Note parameter I
DFR	Reset lock flag
DFT	Deleting retract counter
DFX	Write value into cassette
DFY	Read value from cassette
DFZ	'Power on' - RESET without PUT

Command	Description
DGblank	Determine reference value
DHC	Key test
DHI	Request Initial Value
DHL	Load line code
DHO	Switch encryption off
DHT	Load transport key
DHZ	Transparent ChipCard access
DIC	Software transfer: Activate booter
DID	Software transfer: Data
DIH	Software transfer: Firmware 'HASH'
DIL	Software transfer: Read firmware ID
DQA	Set the real-time clock
DQB	Read the real-time clock
DQC	Reading error statistics
DQE	Internal commands: Read error information
DQF	Internal commands: Read EEPROM
DQI	Describe stacker-EEPROM
DQJ	Read manufacturer's and controller identification
DQR	Internal commands: Read Recovery Information
DXa	Self-test commands
DYa	Test commands
DYS	Resetting internal statistics
DYR	Test commands: Read internal statistics

Booter commands

Dix	Software transfer
DEF	Read properties

Control block

The control block is comprised of:

- CPU
- Memory
- Serial interfaces
- Control functions

CPU

The CPU is comprised of one microprocessor Intel 80C188XL and one external clock generator (40 MHz).

Memory

The memories are supplied by a permanently installed battery when the power unit is switched off. This guarantees that the data or programming are preserved even when the power unit is switched off.

USB interface

USB component USBN9603 from National Semiconductor is deployed on the CMD controller. This component has one standard endpoint (EP0) and a maximum of six additional endpoints (EP1 – EP6).



Information regarding the control procedure and the data structure can be found in the software manual for the CMD-V4.

Serial interface

The asynchronous serial interface with the associated driver/receiver components are implemented with the DUART component.

i Information regarding the control procedure and the data structure can be found in the software manual for the CMD-V4.

Status display

A 2-digit display (Seven Segment Display) displays the status of the CMD-V4 or VCMD.

The meaning of the status displays can be found in the chapter "Troubleshooting".

Function key

In certain cases it is advisable to check whether the CMD-V4 or VCMD is ready to operate without using further help tools.

In addition, a function button is located on the controller below the status display. When the function button is pressed, the available function range is output to the status display in a loop. To select a function, release the button when the display corresponding to the desired function is shown.

More detailed information can be found in the chapter "Device overview and operation", section "Function test".

Photosensor logic board

The photosensor logic span the generation and control of the photosensor LED transmission current and the measurement of the receive voltage of the phototransistors.

When the photosensor parameters are initiated automatically, the optimum values for transmit current and gain of the evaluation logic are determined for each photosensor. The gain for the evaluation logic can be switched in four levels.

The transmission diodes are operated with pulsed current. The reception logic evaluate only the alternating portion. This is used to reduce the influence of outside light on the receive signal.

The photosensors are queried individually, one after the other. Each photosensor is operated thereby with its individual parameters (current and gain). A continuous readjustment of these parameters takes place during ongoing operation. The parameters for the operation of the photosensors are contained in a table in the CMOS memory and are not lost when the CMD or VCMD is switched off.



An intialization takes place automatically at the time of the first start-up or after the deletion of the photosensor CMOS range when the device is switched on. It is an absolute requirement for initialization that all of the light paths of the photosensors be free. If this is not the case, then the error message <22> will appear on the status display (see chapter "Troubleshooting").

Measurement of the banknotes with the multiple-note detection unit

The multiple-note detection unit (DDU) in the CMD-V4 is located in the upper dispensing unit (or in the dispensing unit at the very front with the VCMD). The dispensed notes deflect two tracer levers equipped with magnets during the transport. The oppositely arranged hall sensors generate a signal analogous to the note thickness during this process.

The CMD controller records the banknote length and the banknote thickness of new note types with the so-called reference value determination.

With the multiple-note detection unit, it is possible to recognize good single and good double banknotes. Notes with measured values that vary too greatly from the nominal values for single or double notes are recognized as faulty and may not be issued to the customer. A faulty note is temporarily stored in the single reject switch compartment in such cases (if available). Notes that are too crooked (more than 22°) or long-fanned multiple dispenses (larger than 115°mm or 4.53") are no longer permitted to be stored in the single reject boxes. These are directly transported via the stacker wheel into the clamp and subsequently trigger a bundle reject.

In systems without a single reject function, each bad note triggers a bundle reject.

Component control

Dispensing unit control

The dispensing unit control is divided into:

- Logic for dispensing clutches, retaining spring magnets and cassette stepper motors
- Photosensors for dispensing sensors and cassette empty sensors
- Pressure measurement including cassette available sensor

The control for a maximum of two double dispensing units and two single dispensing units or for a maximum of six single dispensing units is to be found on the CMD controller. The drivers for the dispensing clutches, retaining spring magnets and cassette stepper motors are located on the quadruple distributor board for the basic version of the CMD with two double dispensing units. Two connectors are available for connecting a maximum of two additional 1-cassette distributor boards with drivers for one additional single dispensing unit each. The distributor boards with their two connectors are connected thereby to the distributor board positioned above them. This linkage enables the controller to recognize the number of distributor boards and to derive the cassette plug-in positions from them automatically.

Cassette control

Note contact pressure

The pressure is generated by a stepper motor. After the required value is achieved with a current of approx. 0.8 A, it switches to the holding current of approx. 0.3 A.

Cassette ID

Every cash-out cassette has a serial EEPROM 64 x 16 bit in the connector housing to share parameters. Only one cassette is selected during data traffic. Serial data traffic can proceed after the supply voltage is switched on for the selected EEPROM.

Control of the shutter module

An optional shutter module can be connected to the controller. The control of the shutter is integrated on the CMD controller. It is comprised of the following parts:

- Shutter motor driver
- Receiver for the two shutter sensors
- Control of the photosensors in the shutter

Safety switch

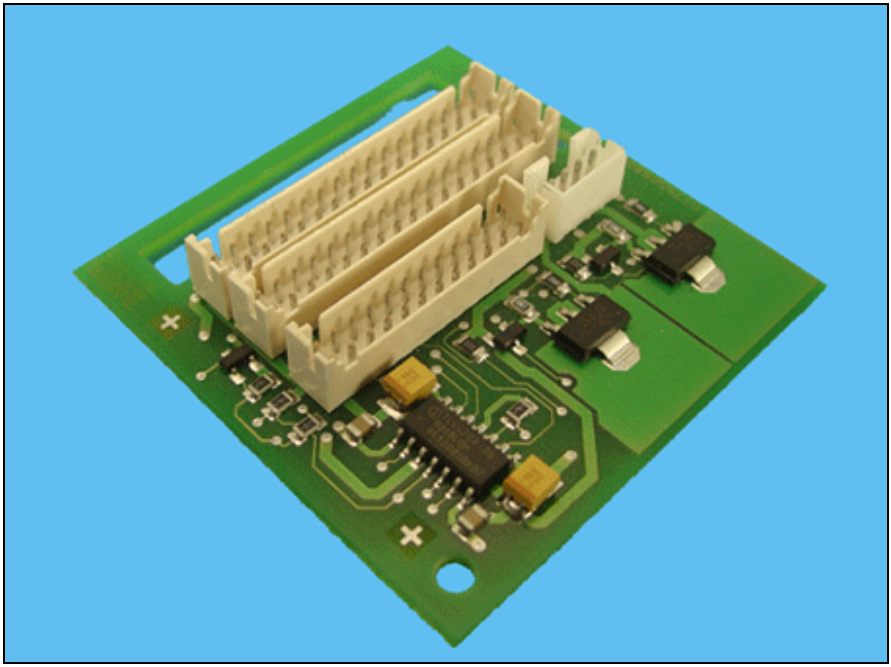
The safety switch monitors the start position of CMD; if the CMD is pulled out of the safe, it will be put out of operation.

Locking switch (CMD-V4 only)

If the dispenser is not fully inserted into the safe (status display <09>), the FW prevents the clamp moving to the vertical cash-out position by querying the locking switch. This applies only to versions with vertical output transport.

In the ProCash 5000 (mini) and ProCash 5100, the locking switch is short-circuited via the system-specific wiring.

Extension board for ProCash 5000 (mini)

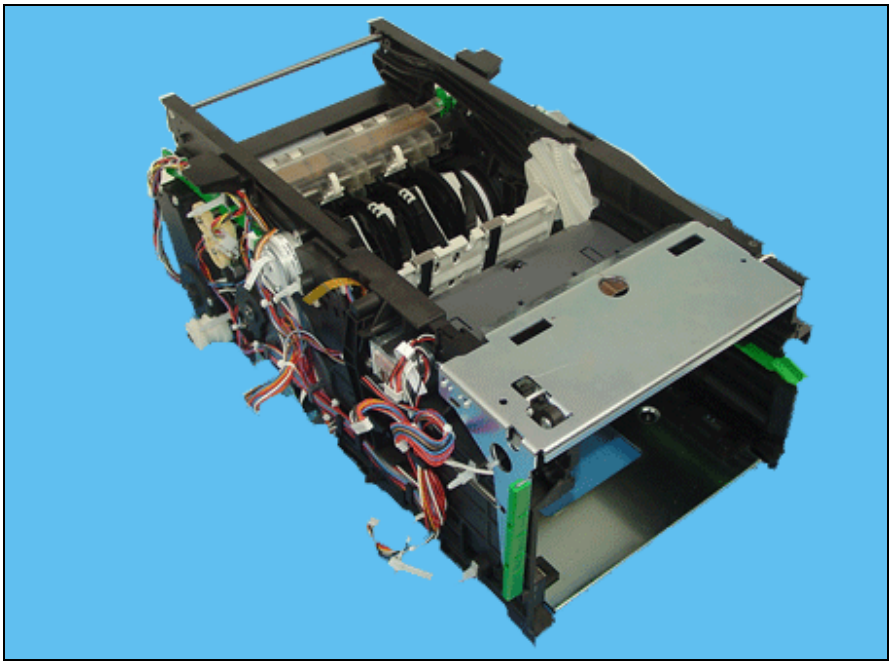


The extension board (01750068065) is used in connection with the ProCash 5000 (mini) and is used to control the additional CMD status display and the left-hand and right-hand user guidance on the operating panel. This is utilized only when the ProCash 5000 (mini) has been supplied without a system unit (PC).

The Stacker

CMD-V4

The stacker with retract function is on the upper rack. The stacker serves all output types. The configuration depends on the output transport. The single reject function is installed in countries outside of the European Union.



The stacker collects impeccable notes in the stacking position of the clamp. If the Single-Reject function is present, then rejected notes will be removed individually (a maximum of two 'bad note' per transaction). In the absence of a Single-Reject function, the rejected note will be removed by a Bundle-Reject function and placed into the Reject/Retract cassette.

A bundle output from the stacking position of the clamp is controller by the routing disk. The clamp is closed with the help of the routing disk.

The clamp transports the bundle, guided in gear tracks, to the respective position. The drive motor for the drive system is mounted on the clamp.

The routing disk determines the path of the clamp. It aligns itself in accordance with the requirements. If the clamp reaches the customer cash-out position, the bundle is transported somewhat out of the clamp. This takes place with the help of the installed belts which are controlled by a separate drive motor on the clamp.

A bundle of notes can be transported from the customer cash-out position and into the retract box of the reject/retract cassette by the retract function. The SAT (SAT = Stacker And output Transport) can transport bundles from the stacking position to the customer cash-out position or into the reject/retract cassette or from the customer cash-out position back into the retract box of the reject/retract cassette, where they are stored unsorted. The number of storage events is counted (presuming there is a corresponding output transport).

Optionally, a bundle can be retracted and stored in the stacking position of the clamp. If this option is used, however, no further device operations are possible until the bundle is removed by an operator and the software has canceled the lock.

The drive system of the transport belts in the SAT (except for the clamp) is provided by the main motor that also drives the dispensing units.

The reject/retract can be simply be pushed into the SAT. It engages in place and is locked in the final position. The cassette position is queried by a switch. To remove the cassette, it must be released with a lever on the SAT.

The banknote path can be viewed and is accessible throughout the entire SAT.

The main motor can be swung away for the purpose of accessibility to the single reject compartment.

Stacker EEPROM for the CMD-V4

The EEPROM is physically mounted to the stacker (in the area of the stacker wheel).

The device version (e.g. single reject) is stored in it, if it cannot be stored electronically.

The information reaches the EEPROM during production.

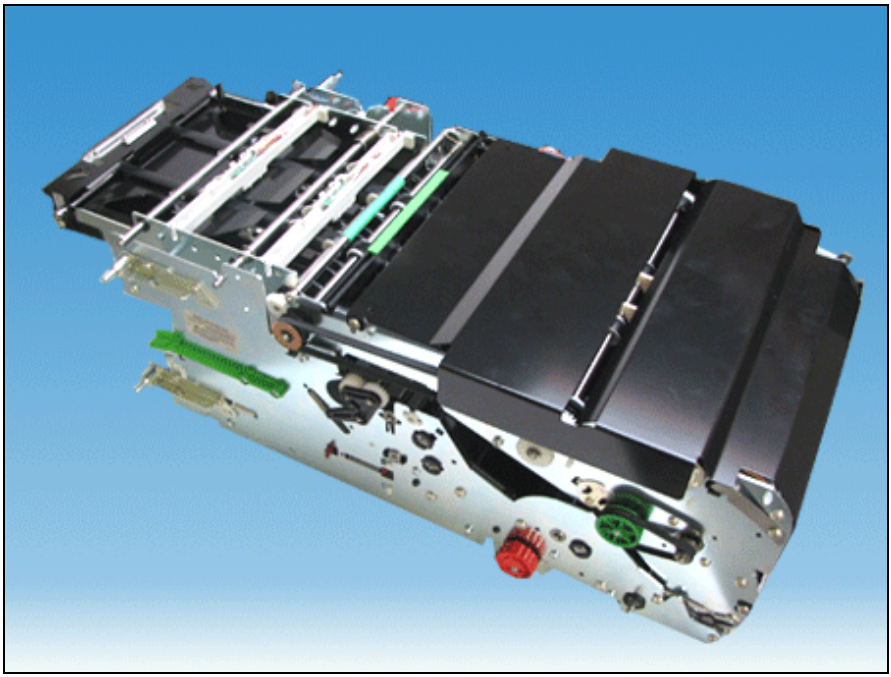
The following information is stored in the EEPROM:

- Version of the EEPROM structure
- Checksum
- Firmware name
- Serial number
- Type
- Hardware configuration of the CMD-V4
- Single reject configuration
- Routing disks positions
- Offset routing disk

i The EEPROM must always remain on the stacker.

VCMD

This device version has an altered stacker and output transport.



The function of the single reject is always available. Any questioned ('bad') note that is detected is removed by the single reject switch. All 'good' notes are made available as a bundle in the stacking compartment via the stacker wheel. The notes are transported out of the stacking compartment into the cash-out position by belt transport. After this, the notes which were placed in preparation in the standby position are issued to the customer.

i The reject cassette used with the VCMD does not have a retract box.

Serial Number Recognition

Serial number detection can be optionally configured in the CMD-V4 for specific countries. The bank note is registered and an image of the note is transmitted to the product-specific software. This prepares the data for evaluating the serial numbers on the notes.

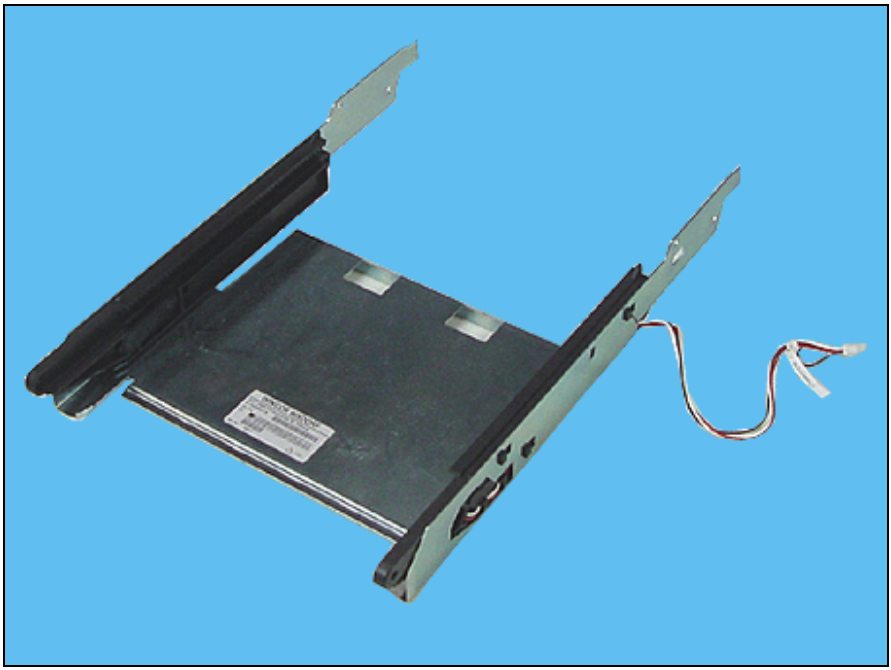
The hardware for the serial number detection is divided between two scanning rails and the logic board. The scanning rails are installed opposite one another in the stacker in the area of the bank note input. The logic board is installed on the side on the stacker. Power is supplied through the CMD-V4. The control and data linkage is carried out directly on the system unit (PC) via USB. The product-specific software controls the complete sequence of the serial number detection.



The scanning rails located opposite one another record both sides of the bank note, line by line, shortly before it enters the stacker wheel. The data are transmitted to the logic. These prepare the data and then convey it to the PC through the USB interface. The product-specific software receives the data and prepares it for further processing.

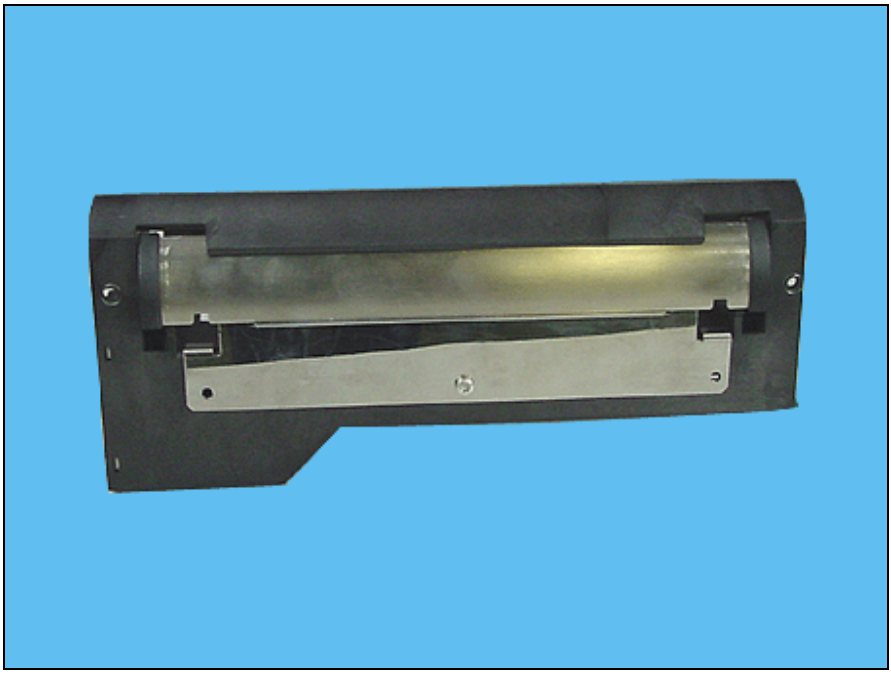
Output transport

The output transport differs, depending on the device version. The following illustration shows a output transport for a Rearload device with horizontal output. The output transport is secured to the stacker (only with horizontal output) and is controlled via the CMD controller.



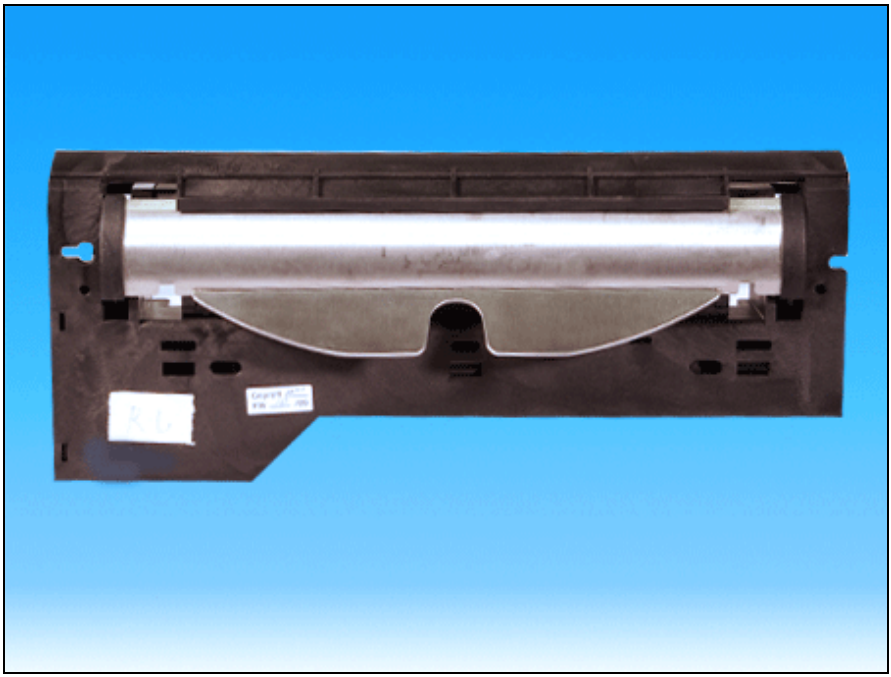
Shutter

The shutter is a bank note cover flap which is controlled with the CMD controller.



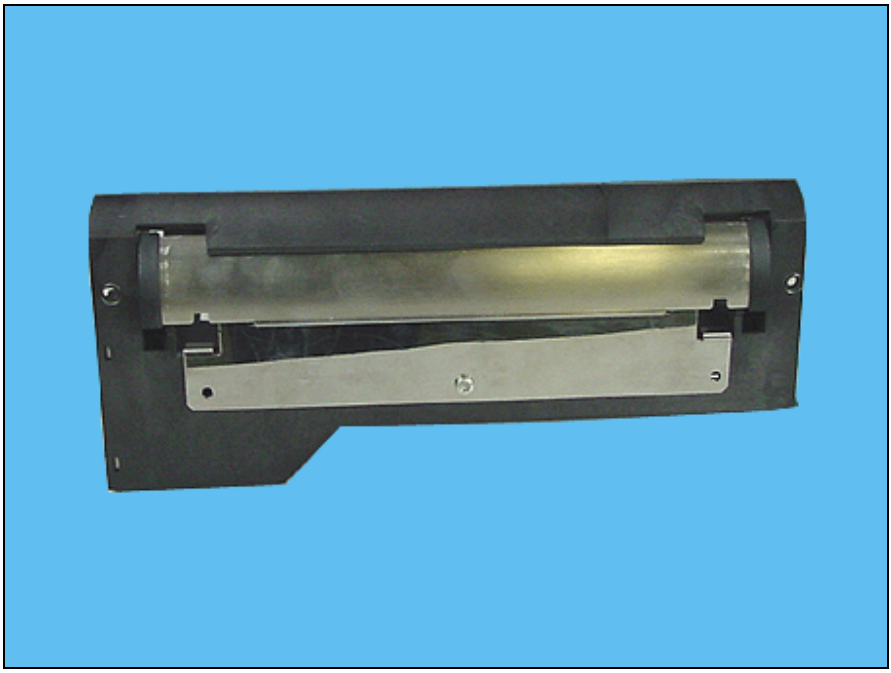
Shutter Anti Cash Trapping

The Shutter Anti Cash Trapping is a bank note cover flap which is controlled with the CMD controller. The shape of the shutter flap is intended as a mechanical measure to prevent the attachment of a trapping device in front of the bank note cover flap.



VBK shutter

The shutter is a bank note cover flap which is controlled with the CMD controller. The attachment of a trapping device in front of the bank note cover flap is intended to be detected by means of sensor systems. Two different procedures are deployed for this purpose. The first procedure depends on a transmitter positioned outside of the shutter area, the second on a distance sensor that is installed inside the shutter.



The dispensing unit

CMD-V4

With the CMD-V4, each user can select the right device configuration for his requirements by choosing between different models (Indoor/Outdoor, Frontload/Rearload) and among a variable quantity of dispensing units (1-6).

The multiple-note detection unit must be positioned in the top dispensing unit. It checks whether double or overlapping notes have been dispensed.

VCMD

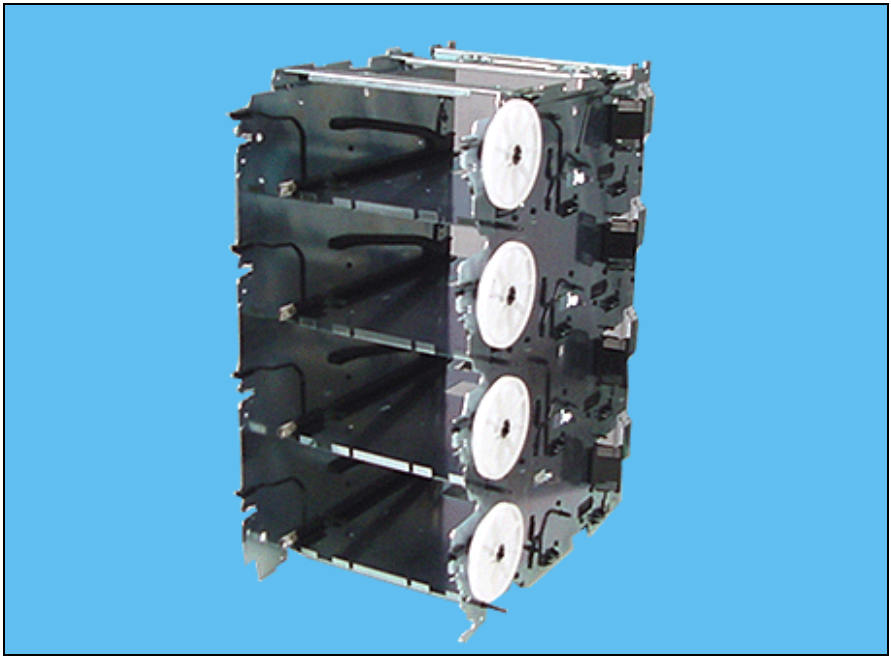
In the case of the VCMD, the selection of different devices and the variable design of the dispensing units (1-6) make it possible for the respective user to select the device version that is most suitable for him.

The multiple-note detection unit is located in the VCMD in the dispensing unit at the very front. It checks whether double or overlapping notes have been dispensed.

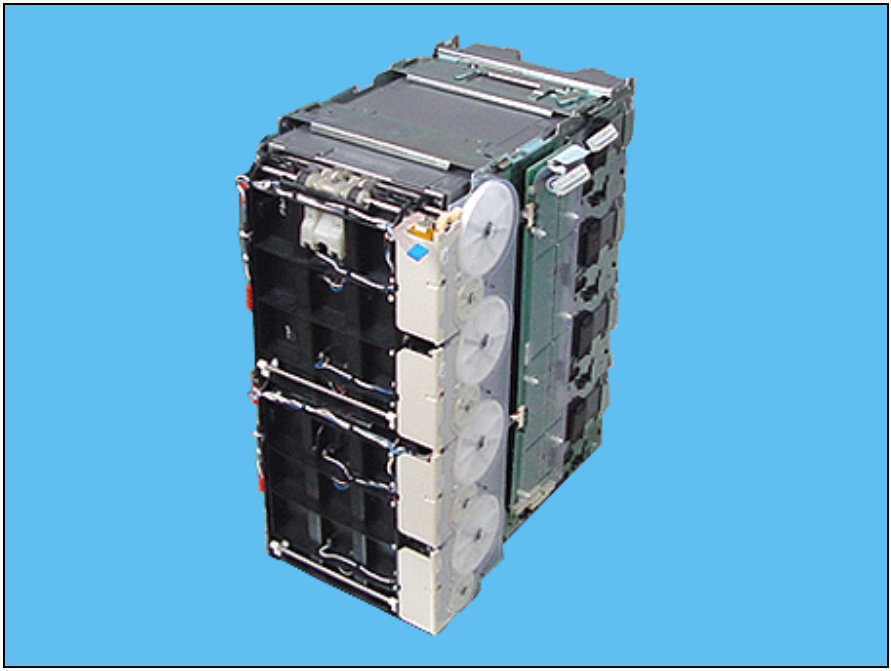
Racks

Each of the racks can be configured with a single dispensing unit or with a double dispensing unit. They become a operable component only in conjunction with the dispensing units.

Quadruple rack without dispensing units (CMD-V4)



4-cassette housing with double dispensing unit and 4-cassette distributor board (CMD-V4)



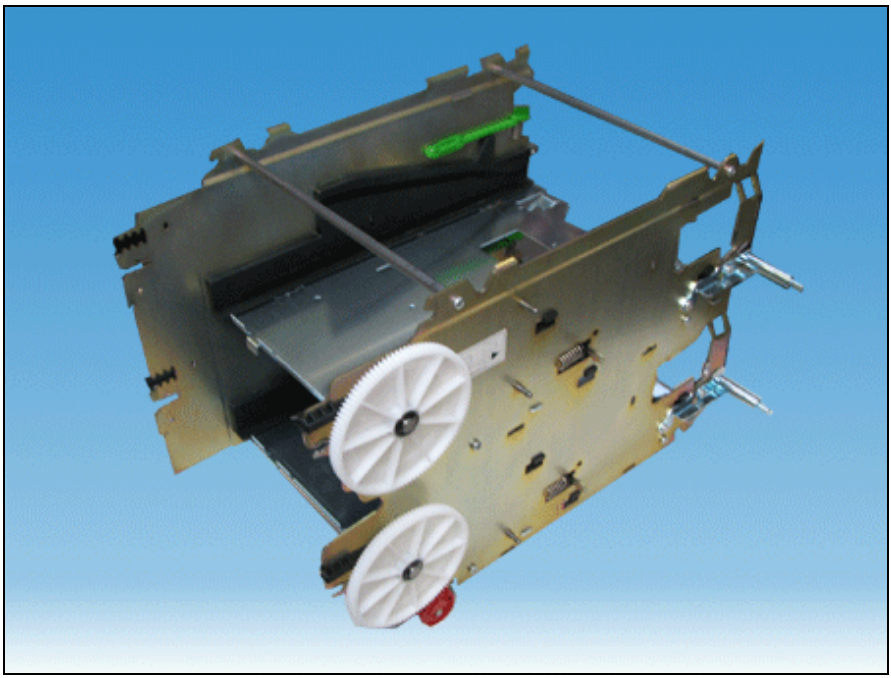
Each quadruple rack consists of four cassette mountings and at least one double dispensing unit with a multiple-note detection unit. The second double dispensing unit without a multiple-note detection unit is then used if more than two cassettes are configured.

The multiple-note detection unit must always be in the upper dispensing unit.

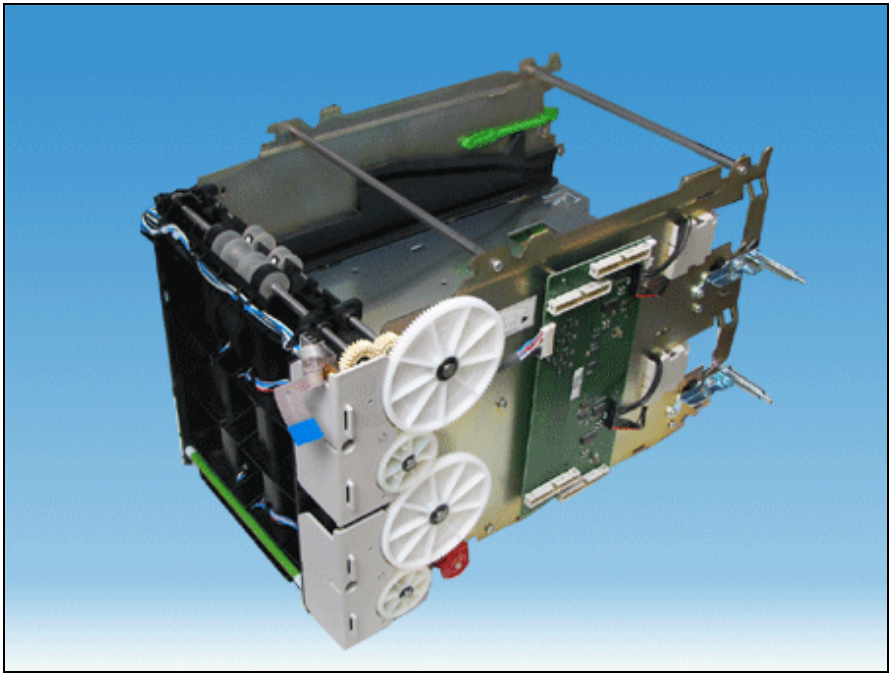
i If only one double dispensing unit is available in a 4-cassette housing, then the jumper must be configured in accordance with the CMD controller.

The pressure of the banknotes on the extractor shaft is evaluated with a pressure sensor. The note dispensing proceeds by means of downward friction. The dispensing unit extracts only one note at a time from the cash-out cassette and transports it to the stacker. Two sequential notes have a minimum distance of 67 mm (2.64") from one another during this process. Subsequent notes are held back by a retaining shaft that is actuated by a magnet.

2-cassette housing without dispensing unit (VCMD)



2-cassette housing with one double dispensing unit and 2-cassette distributor board (VCMD)



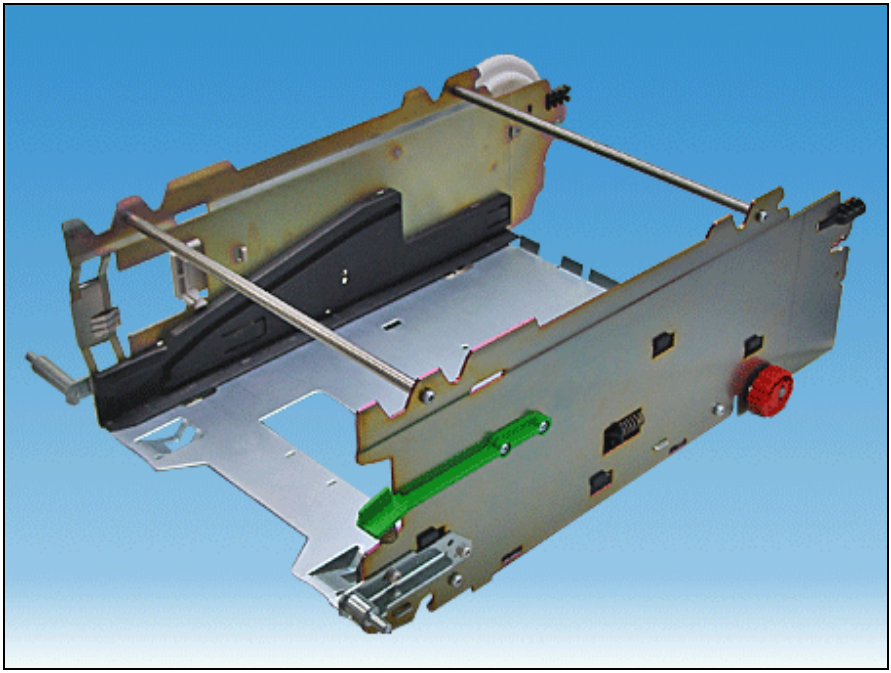
Each 2-cassette housing consists of two cassette mountings and one double dispensing unit.

The multiple-note detection unit must always be in the dispensing unit at the very front.

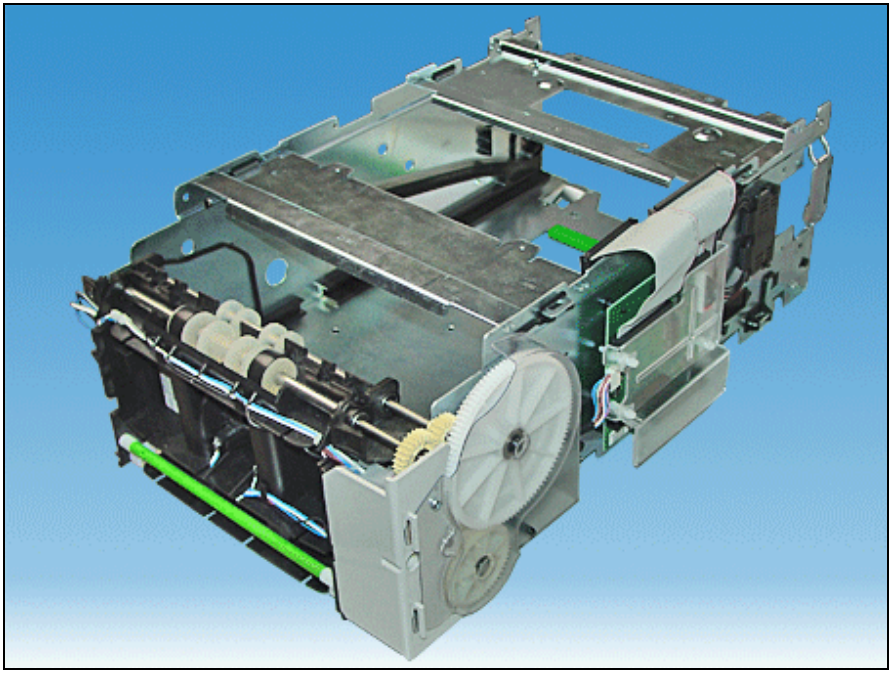
The pressure of the banknotes on the extractor shaft is evaluated with a pressure sensor. The note dispensing proceeds by means of downward friction. The dispensing unit extracts only one note at a time from the cash-out cassette and transports it to the stacker. Two sequential notes have a minimum distance of 67 mm (2.64") from one another during this process. Subsequent notes are held back by a retaining shaft that is actuated by a magnet.

A VCMD with several cassettes is achieved by lining up housings with dispensing units next to one another, whereby the dispensing unit at the very front must be the one containing the multiple-note detection unit.

1-cassette housing without dispensing unit (VCMD)



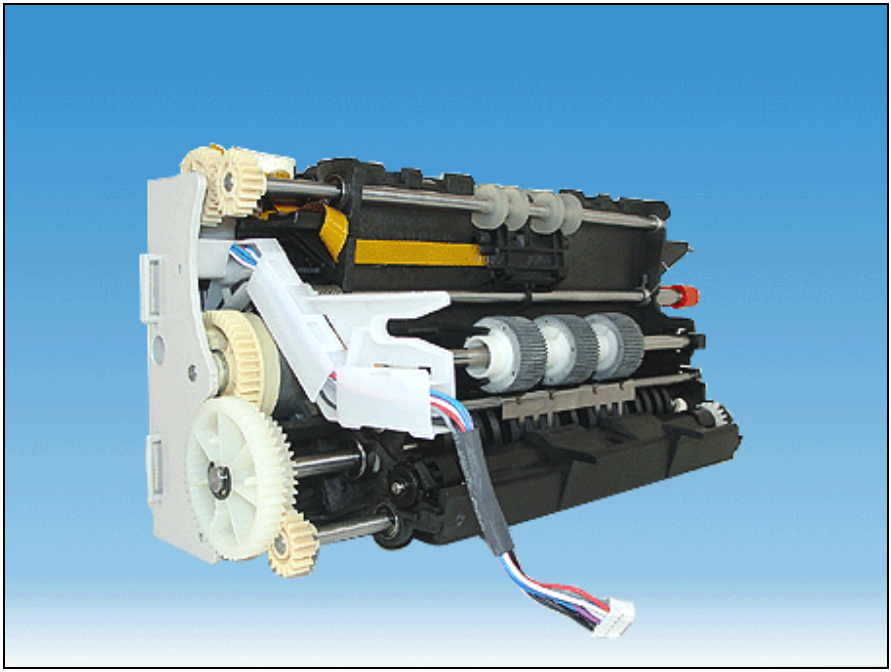
1-cassette housing with one dispensing unit (VCMD)



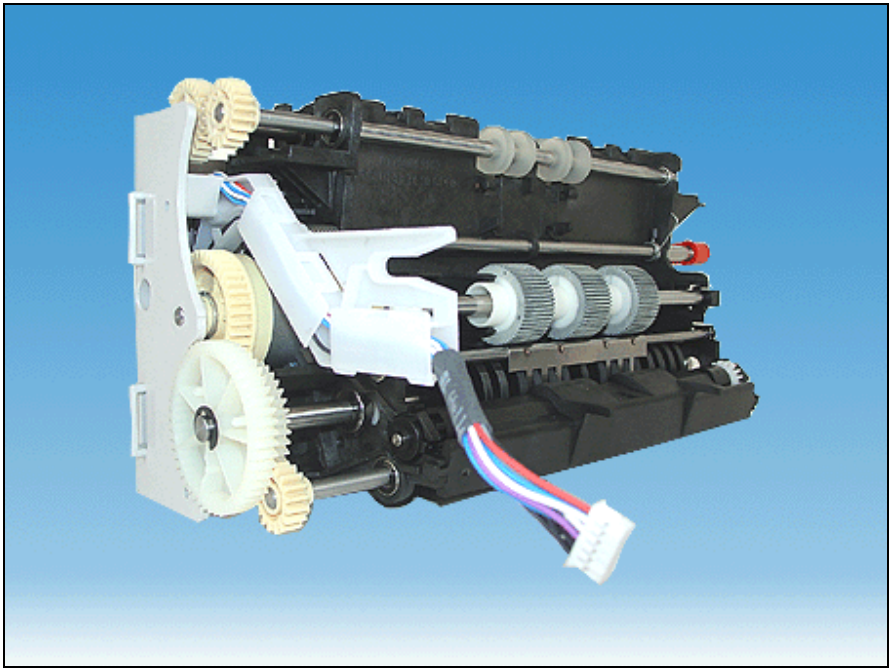
Each 1-cassette housing consists of one cassette mounting and one dispensing unit with a multiple-note detection unit.

The pressure of the banknotes on the extractor shaft is evaluated with a pressure sensor. The note dispensing proceeds by means of downward friction. The dispensing unit extracts only one note at a time from the cash-out cassette and transports it to the stacker. Two sequential notes have a minimum distance of 67 mm (2.64") from one another during this process. Subsequent notes are held back by a retaining shaft that is actuated by a magnet.

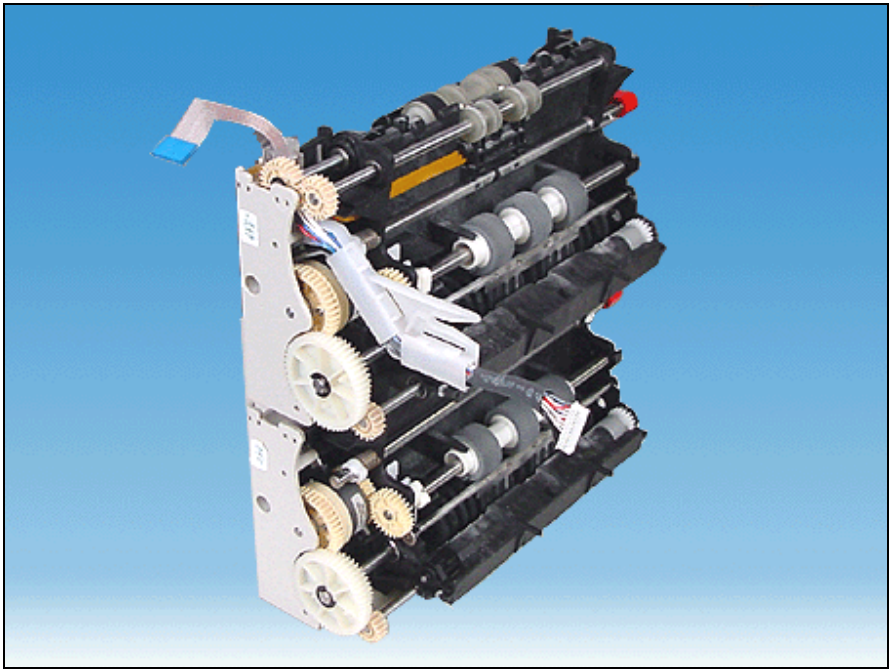
Single dispensing unit with DDU (CMD-V4 or VCMD)



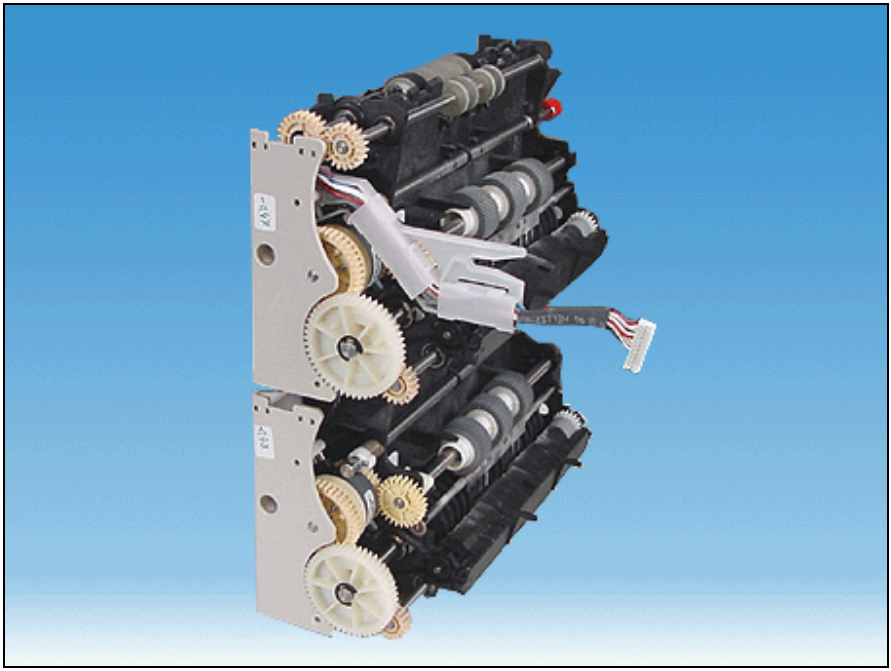
Single dispensing unit without DDU (CMD-V4 or VCMD)



Double dispensing unit with DDU (CMD-V4 or VCMD)



Double dispensing unit without DDU (CMD-V4 or VCMD)



A pendulum dispensing shaft is installed for the note dispensing. The drive of the extractor shaft is provided by the central motor as well as a magnetic coupling for each extractor shaft. At one end of the extractor shaft there is a pressure sensor through which the note contact pressure and the message 'Cassette pushed in' are checked. A forward motion of the notes is brought about by an additional roller in the cassette. Preliminary separation is achieved by means of an extended inlet slope in the cassette.

The cassette can readily be pushed into the rack with dispensing unit(s). They engage in place and are locked in the final position. The cassette position is queried by the pressure sensor. The cassettes can be unlocked with the release lever on the rack.

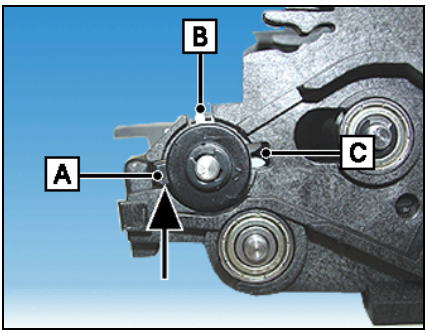
Voltages and signals from the controller to the cassette are redirected through the cassette connector.

The following components are addressed in the dispensing unit.

- Dispensing clutch
- Retaining magnet
- 'Note dispensing' photosensor
- 'Cassette empty message' photosensor
- Pressure sensor for 'Cassette pushed in' and 'Note contact pressure'

Adjustment eccentric

The adjustment eccentric is part of the dispensing unit with which the dispensing gap (V gap) can be set.



There are three settings for the eccentric: Setting A, B and C.

In new deliveries, they are always set to position A. If a replace dispensing unit is supplied, its maximum setting is B.

If the double dispenses from a single cassette in the CMD-V4 become more frequent, the V gap on the corresponding dispensing unit can be decreased by increasing both eccentrics (respectively to left and right of the shaft) by one step, e.g. from A to B. If the V gap is set too high, than no dispensing from the corresponding cassette will be possible.

Photosensors in the dispensing unit (CMD-V4 or VCMD)

The message PSE (Photosensor empty (cassette empty message)) is triggered if there are no longer any banknotes in the cassette. The photosensor ray is guided back to the receiver in the dispensing unit through a prism in the pressure carriage of the cassette.

Pressure sensor (CMD-V4 or VCMD)

The pressure sensor (PSD) provides the position as an analog value and thus the pressure of the extractor shaft. It can also be determined whether the cassette is available.

The Reject/Retract cassette (CMD-V4 or VCMD)

i Only cassettes with a blue cover are suitable for the vertical operation of the VCMD.



The Reject/Retract cassette contains two separate compartments into which the notes can be brought using the software controls. The chute selection is carried out by a lift magnet in the SAT.

In order to remove the notes from the retract box, the compartment can be swung into the output position with a lever when the cassette lid is open.

The reject cassette corresponds to the greatest extent possible to the Reject/Retract cassette, except for the fact that the retract compartment is omitted at the factory. Only the reject cassette is used with the VCMD. The term Reject/Retract cassette is used for both types in the following.

The Reject/Retract cassettes are available in two different versions. Depending on the version, they can be opened with a key or by toggle. The possibility of lead-sealing is available for both versions.

A tamper indicator is located in the reject/retract cassettes. The condition of the tamper indicator can be recognized on a window in the rear panel.

If the reject/retract cassette has been manipulated, then it can no longer be deployed in the SAT. Any attempt to deploy the cassette will be stopped during the attempted deployment. A display window on the rear panel of the cassette offers information about its status:

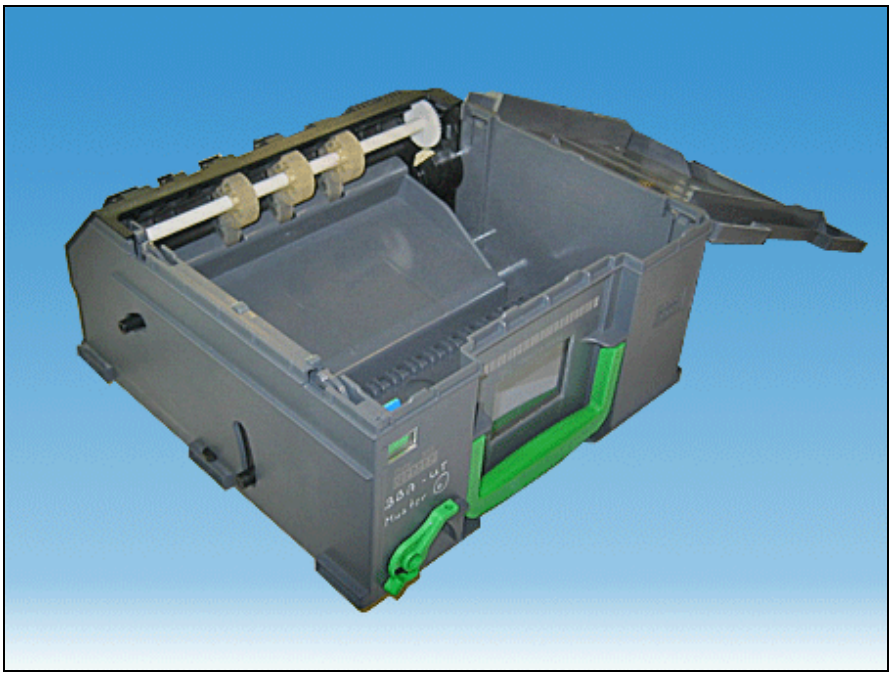
green: cassette ready to be slid in
blue: force was used to open the cassette

The retraction mechanism is deployed at the face. The note-in takes place at the face at an angle from above. Two feed-in rollers are operated by a gearwheel on the right-hand side of the cassette which convey the individual notes or bundles into the cassette.

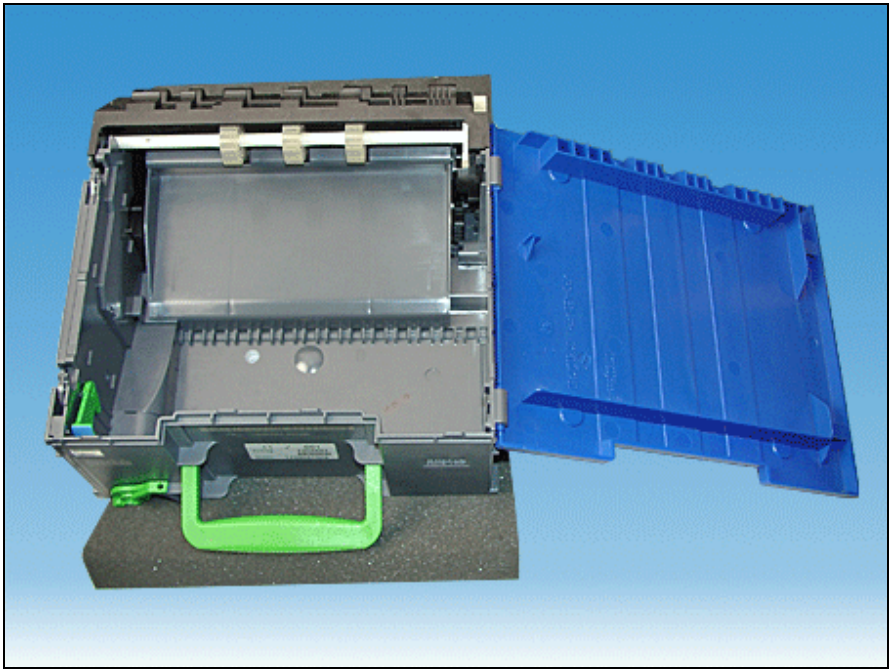
The input area of the Reject/Retract cassette is opened during deployment in the SAT by lateral plugs that are moved in the cranks in SAT. The cassette closure is formed as visor.

The cassette is locked in the final position; the reaching of this position is reported by a switch. The two cassettes are released after being unlocked manually.

Reject/Retract cassette opened (CMD-V4)



Reject cassette opened (VCMD)



The cash-out cassettes



Only cassettes with a blue cover are suitable for the vertical operation of the VCMD.

The cash-out cassette is available in two versions. The standard version is equipped with a motorized pressure carriage. The VCMD version is equipped with braking strips. The (to a certain extent abbreviated) differentiation features Standard and VCMD are used simply as a distinguishing nomenclature for the purposes of this service manual. The Sales Department uses the term cash-out cassette (Standard). Depending on the version, they can be opened with a key or by a lever.

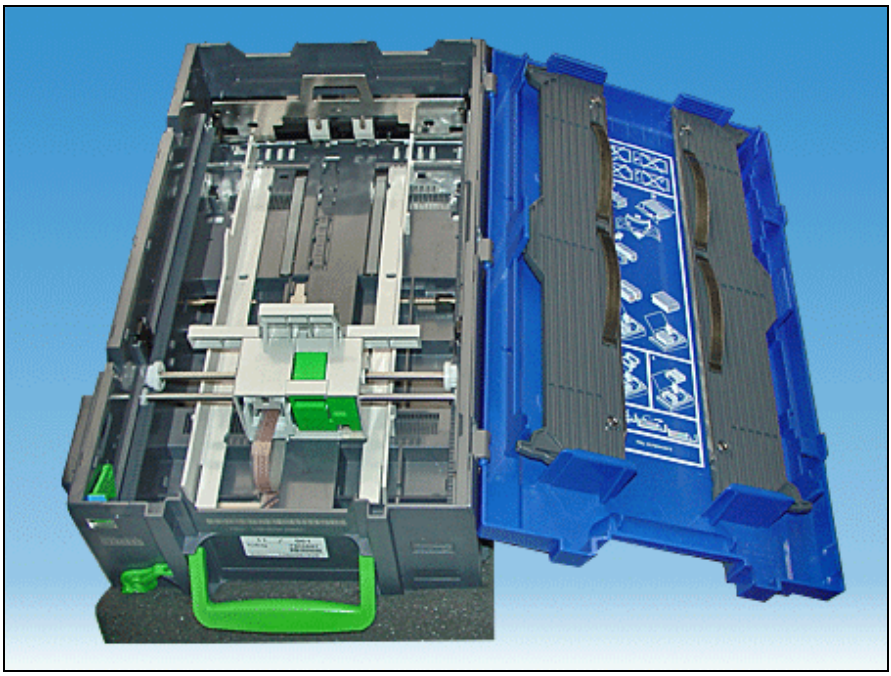
The following cassette versions are available:

Operation	**Lever**	**Lock**	**Lead seal**	**Tamper indicator**	**Ink Dye (integrated maculation - system)**
Standard	X		X	X	
VCMD	X		X	X	
Standard (Security I)		X	X	X	
VCMD (Security I)		X	X	X	
Standard (Security II)		X	X	X	X

Cash-out cassette standard



Cash-out cassette opened (VCMD)



In principle, the cash-out cassettes of the CMD-V4 and the VCMD are of identical construction. The stack of notes of the cassette receive a pressure to start to the dispensing area through the vertical operation of the VCMD. Two braking strip are integrated in front of the dispensing area which reduce the pressure on the notes in combination with the pressure springs in the cover.

A tamper indicator is located in the Standard and VCMD cash-out cassettes. The condition of the tamper indicator can be recognized on a window on the cassette grip side.

The cassette is stopped during additional deployment attempts with the visor open during the deployment. If the tamper indicator shows 'green' and the visor of the cassette is closed, then the cassette can be deployed in the CMD-V4 or VCMD. Cash dispensing transactions can be carried out.

The tamper indicator can be reset by rotating the release lever or the lock. A display window on the grip side of the cassette provides information about the closing status:

green: cassette ready to be slid in
blue: cassette has been manipulated

The output area of the cash-out cassette is opened during deployment by lateral plugs that are moved in cranks in the housing.

The cassette closure is formed as visor. The pressure is applied by means of a pressure carriage operated by a stepper motor. The pressure carriage is contained in the side cover of the cassette.

The cassette number is preset at the factory at the time of shipment. It is saved in an EEPROM and can be changed per software command.

The cassette has a connector on the side cover through which the EEPROM and the stepper motor are connected. The EEPROM itself is located in the connector housing.

A gummed label for identification of the cassette can be attached in a recess of the housing on the cassette grip side (type of bank notes, cassette number, etc.).

The currency or denomination is lasered in at the time of configuration at the factory.

Start-up

Initial start-up

During the initial start-up of the CMD-V4 (Cash Media Dispenser) or of the VCMD (Vertical Cash Media Dispenser, respectively), perform the following operations in the stated sequence:

1. Set the cash-out cassettes to the bank note size if they were not preset in the factory
2. Fill the cassettes with genuine money and push them in
3. Update the banknote parameters and cassette filling data
4. Determine reference values for the various note types
5. Genuine money test

i The performance of these steps is described in the chapter "Device Overview and operation."

Start-up after component replacement

You should perform the following steps if you have replaced a component in the CMD-V4 or the VCMD:

1. Initialization of the CMD-V4 or VCMD
2. Set the cash-out cassette to the bank note size if there was no presetting in the factory
   (if this is necessitated by the replacement)
3. Fill the cassettes with genuine money and push them in
   (If this has become necessary because of the replacement)
4. Update the banknote parameters and cassette filling data
   (If this has become necessary because of the replacement)
5. Determine reference values for the various note types
   (If this has become necessary because of the replacement)
6. Genuine money test



The performance of the steps two to seven is described in the chapter "Device Overview and operation."

Electric adjustments CMD-V4 or VCMD

	Photosensor initialization *	Pressure sensor initialization **	Determine reference value ***	Cassette initializa-tion ****
Installation			X	X
Maintenance	X		X	
Stacker replaced	X			
CMD controller replaced	X	X	X	
Dispensing unit with multiple-note detection unit replaced	X	X	X	
Dispensing unit without multiple-note detection unit replaced	X	X		
Cash-out cassette replaced				X
New note type deployed			X	X
New firmware loaded				
Shutter replaced (CMD-V4 only)	X			

* Initialization of the photosensors with removed cassettes, the photosensors should not be covered (KDIAG: DXM)

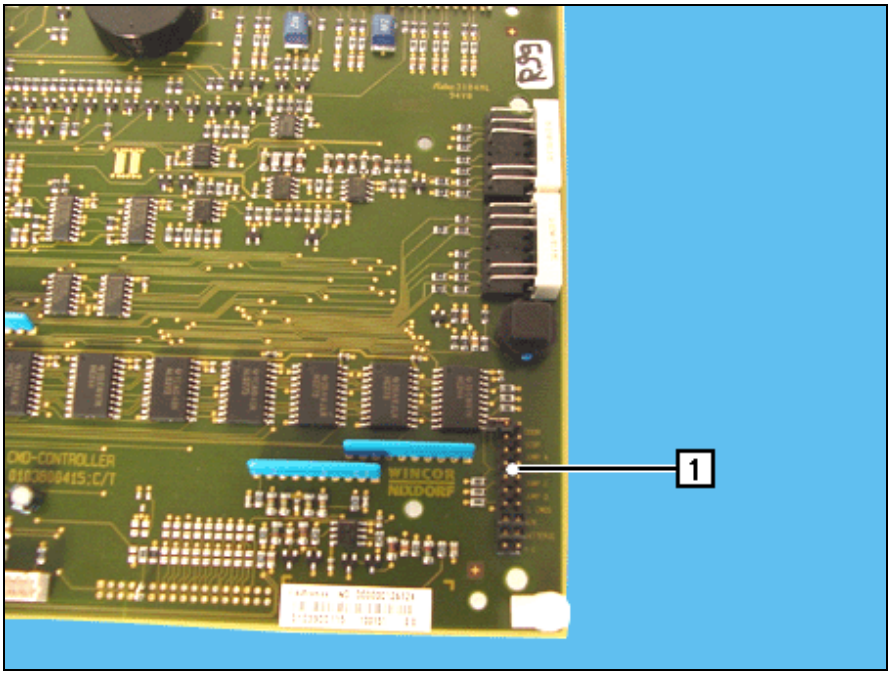
** Remove and reinsert the cassette with switched-on CMD-V4 or VCMD (running operation, no active withdrawal).

*** Reference value determination with initialized/deployed cassettes with genuine money (KDIAG menu 'Device' -> 'CMD-V4' -> 'Cassettes-Init')

**** Initialization of the cash-out cassettes (KDIAG menu 'Device' -> 'CMD-V4' -> 'Cassettes-Init')

Jumper settings on the CMD or VCMD controller

Position of the jumper field on the controller



1 Jumper field on the CMD or VCMD controller

The 10-digit jumper field beneath the status display controls the following settings:

Jumper	Designation	Open	Connected
1	DOOR	Do not heed the door switch during encryption	Heed the door switch during encryption
2	SCOP	Reserve (may not be connected)	
3	Jump A	Set standard line parameter (19200,8,2,ODD); Trigger RESET (subsequently removing jumper again)	
4	Jump B	Two double dispensing units in the 4-cassette housing	Operate a double dispensing unit in the 4-cassette housing as a 2-cassette housing (the two lower dispensing units may be absent when a 4-way distributor board is used)
5	Jump C	Reserve (not used)	
6	Jump D	Reserve (NCR emulation active)	
7	Clear CMOS	Delete CMOS; trigger RESET (subsequently removing jumper again)	
8	NEN	SE controls power-saving mode	NEN signal is generated by the CMD-V4
9	Battery	CMOS back-up battery inactive	CMOS-support battery active
10	Jump PLD	Reserve input to Programmable Logic Device	

Jumper 1 is aligned on the controller board at the top.

Default settings

Jumper connected

NEN

Battery

Jumper connected on one side (on one PIN only)

DOOR (option for activating DOOR)

Setting the cassettes to the banknote size

Read in this connection the sections "Setting note width" and "Setting note height" in the chapter "Device overview and operation".

Fill the cassettes with genuine money and push them in

After the device was switched on and no error occurred, the cash-out cassettes need to be filled with genuine money. Read chapter "Device Overview and operation", section "Filling the cash-out cassette".

Update the banknote parameters and cassette filling data

Please refer to chapter "Device Overview and operation", section "Cassette initialization", to obtain information about this.

Determine reference values for the various note types

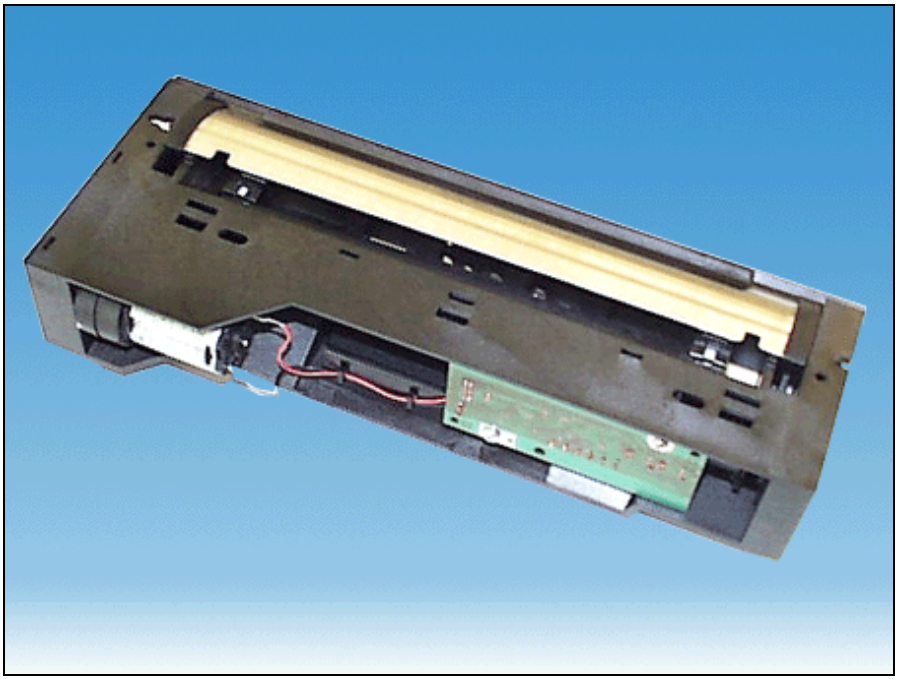
A description of this can be found in the chapter "Device Overview and operation", section "Determining the reference value".

Genuine money test

To do so, please read chapter "Device Overview and operation", section "Function test."

Shutter CMD horizontal

Shutter CMD V4 horizontal RL	01750053690
Shutter CMD V4 horizontal FL	01750056960
Shutter horiz. 8x CMD RL	01750166395
Shutter horiz. 8x CMD FL	01750166396
Shutter horiz. VBK 8x CMD RL	01750187300
Shutter_CMD_V4_horiz._RL_VBK	01750192728
Shutter_CMD-V4_horiz._FL_VBK	01750193245



Installation

The shutter closes the cash output area of the Cash Media Dispenser (CMD) component and consists of the following components:

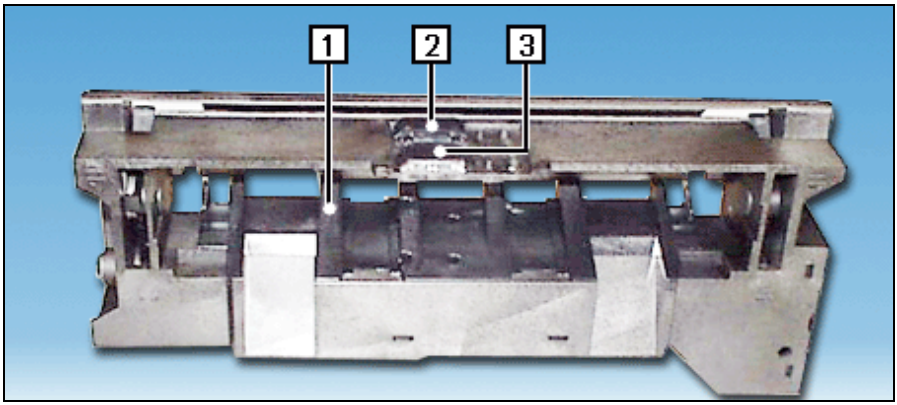
- Shutter flap
- Drive mechanism with DC motor, gear mechanism and interlock mechanism
- 1 photo sensor for the provisioning of a note bundle to the output
- 1 photo sensor for the monitoring of the money withdrawal
- Connector board with two hybrid photo sensors to control of the shutter flap

Both versions (Frontload and Rearload) differ only in the so called 'ramp' in the cash path and in the position of the photo sensors PS 27 and PS 28.

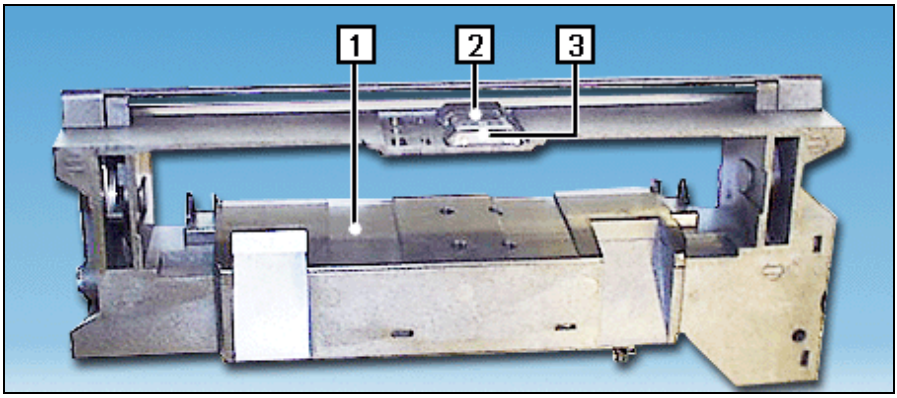
Views

CMD-V4 shutter

Rearload version view

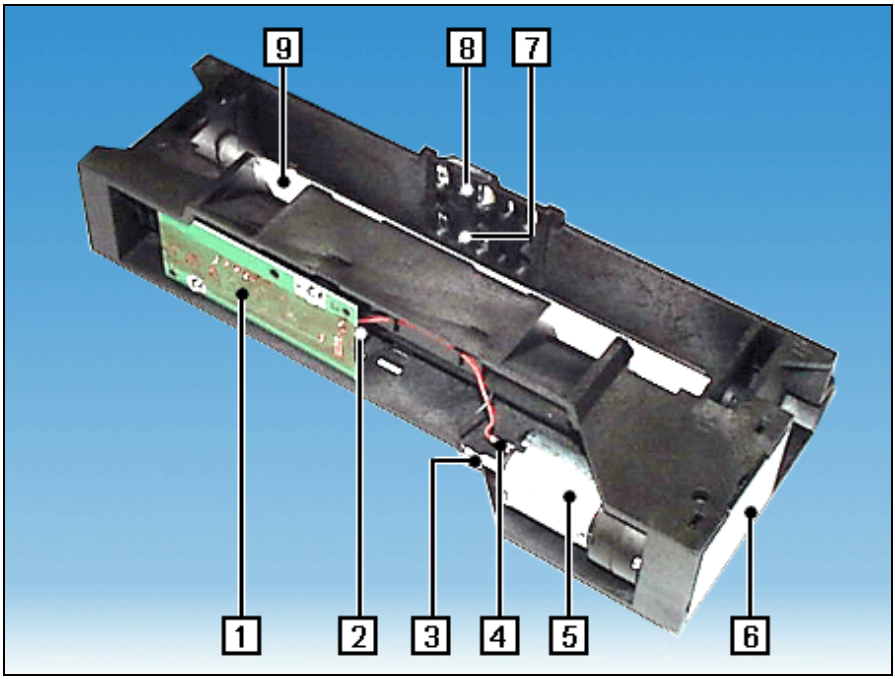


Frontload version view

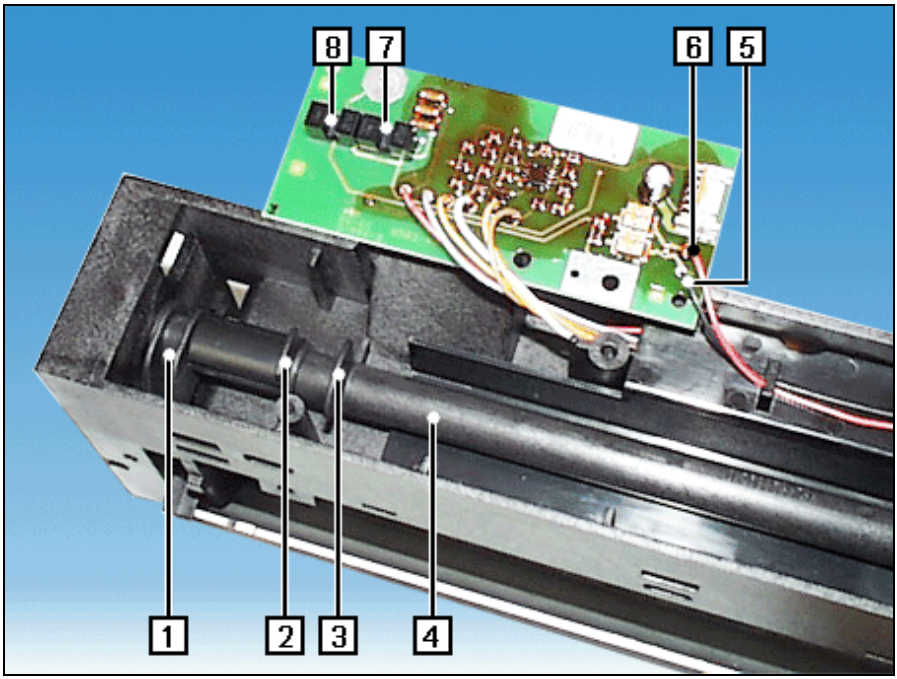


1 Ramp
2 Prism for the PS 27
3 Prism for the PS 28

The structure of the shutter is shown with the Rearload version as an example. The shutter structure is exactly the same in the Frontload version.



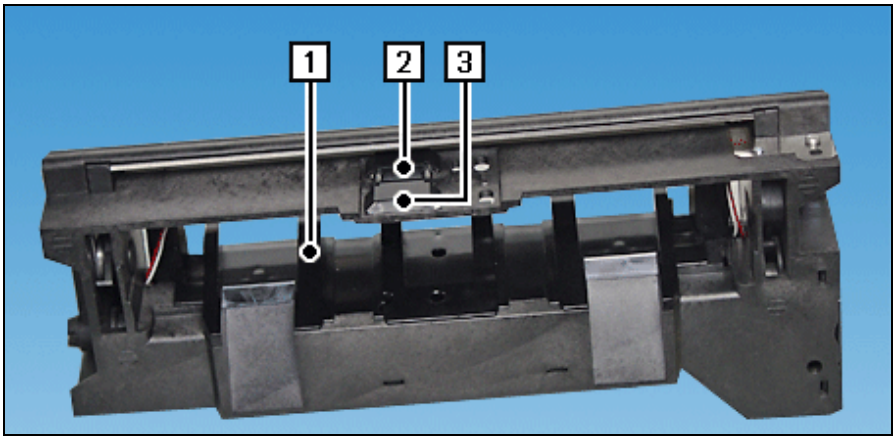
1 Electronics board
2 Connection plug
3 Motor connection (-)
4 Motor connection (+)
5 DC motor
6 Gear mechanism cover
7 Prism for the PS 27
8 Prism for the PS 28
9 Shutter flap



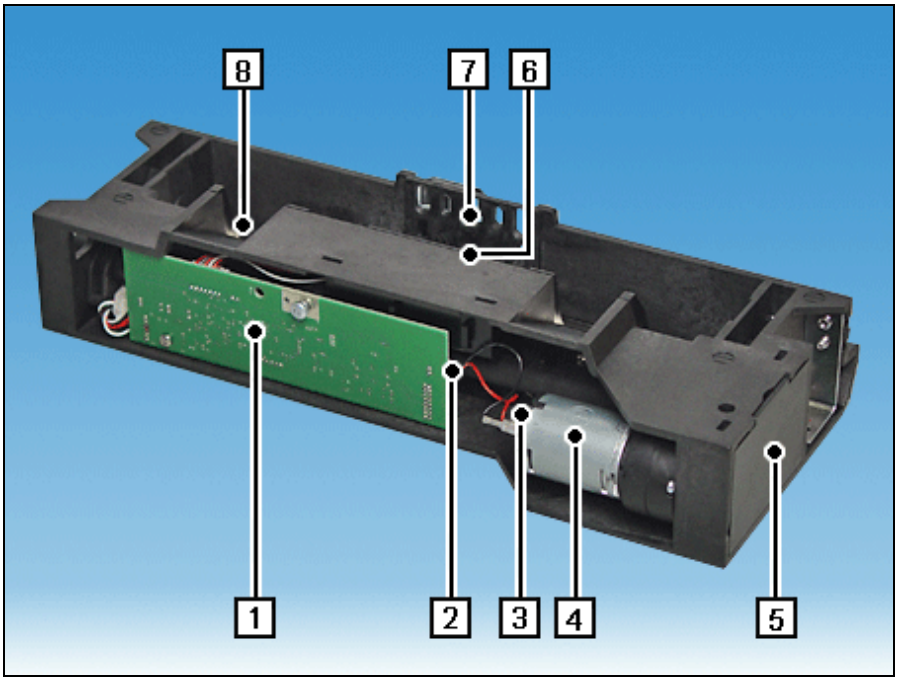
1 Moving and latching mechanism (left)
2 Switching flag for DPS 11
3 Switching flag for DPS 10
4 Drive shaft for shutter flap
5 Motor connection (-)
6 Motor connection (+)
7 Hybrid photosensor DPS 10
8 Hybrid photosensor DPS 11

CMD-V5 shutter

Rearload version view



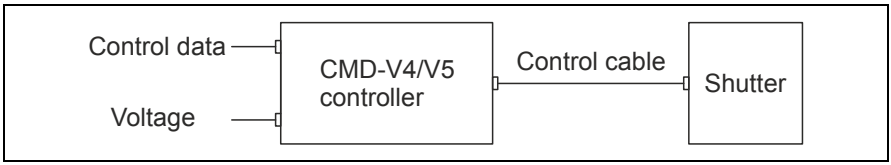
The structure of the shutter is shown with the Rearload version as an example. The shutter structure is exactly the same in the Frontload version.



1 Electronics board
2 Connection plug
3 Motor connection
4 DC motor
5 Gear mechanism cover
6 Prism for the PS 27
7 Prism for the PS 28
8 Shutter flap

Function

The shutter is controlled by the firmware of the CMD-V4/V5 controller and is triggered by the application software.



The firmware evaluates the signals of the photo sensors PS 27 and PS 28 as well as the hybrid photosensors DPS 10 and DPS 11 and controls the motor.

Photo sensor	Function
PS 27	Monitoring the banknote removal
PS 28	Clamp stop position to the banknote removal area
DPS 10 / DPS 11	Position of the drive shaft for the shutter flap

i The designation of the photosensor and the electronic signal are different (see the table in the section "Pin assignment").

The motor-driven shaft has a driving cam on the left and on the right side. They are constructed in such a way that the shutter is locked by the catches on the shutter flap bearings when the shutter is closed.

Shutter and drive mechanism are not directly connected.

When the driving cams turn, the shutter is forced open.

To close the shutter, the cam shaft turns the driving cams back but it is the spring that actually closes the shutter flap.

The latching mechanism of the shutter flap can only be performed if the flap is completely close beforehand.

This construction excludes the risk of injury for the user.

Banknote removal area CMD-V4

If the application triggers the command to dispense the banknotes, the shutter slap opens completely at first via the firmware. After the transportation of the banknotes into the removal position, the shutter flap closes slightly depending on the thickness of the banknote bundle. The thickness of the banknote bundle is evaluated by the thickness measurement in the CMD. The evaluated value functions as a temporary control of the drive motor.

After the withdrawal of the banknotes the shutter flap is opened completely by the firmware and the drive belts in the transport clamp are shortly running backwards. After that the shutter flap closes completely and locks, if there are not any external influences which get in the way.

Error code 28

If the locking procedure does not proceed in 1 second, the firmware turns off the motor, signals an error code (displays error code 28 on the CMD-V4 controller) and messages the malfunction to the application.

Error code 29 (manipulation protection)

If the closing shutter flap covers photo sensor PS 27, the error code 29 is shown on the display. The firmware tries anyway to close the shutter flap. If this is not possible during 1 second, the motor gets switched off.

Banknote removal area CMD-V5

The banknote removal in a system with a CMD-V5 is controlled by the application.

Meaning of the hybrid photosensors

DPS 10	DPS 11	ERROR
Open	covered	Shutter flap is completely open (position OPEN)
covered	covered	Shutter flap is opened (Position between OPEN and BANKNOTE DISPENSING)
covered	Open	The shutter flap is in the locking phase
Open	Open	Shutter flap is closed and locked (position CLOSED)

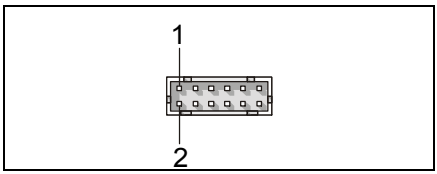
Signal level at the plug:

covered = 1 (H) = + 12 V

open = 0 (L) = 0 V

The level of the DPS 10 and DPS 11 are 0 V and 5 V, if the shutter electronics is connected to a CMD controller. If not, the measurement is not possible.

Pin assignment



Type of connector:
JST PHD 12M

Contact	Designation	Note
1		not used
2		not used
3	+ 12 V	
4	GND	
5	Motor (+)	Motor connection (+)
6	Motor (-)	Motor connection (-)
7	DPS 10	
8	DPS 11	
9	PS 27	
10	PS 28	
11	Transmit current PS 27 and PS 28	
12		not used

Firmware designation	Electronic signal
PS 27	LS 26
PS 28	LS 29

Maintenance

The shutter does not require preventive maintenance under normal operating conditions.

Technical Data

Dimensions:

Height:	128	mm	(5.04")
Width:	304	mm	(11.97")
Depth:	67	mm	(2.64")

Weight: 820 g (1809 lb)

Shutter CMD horizontal

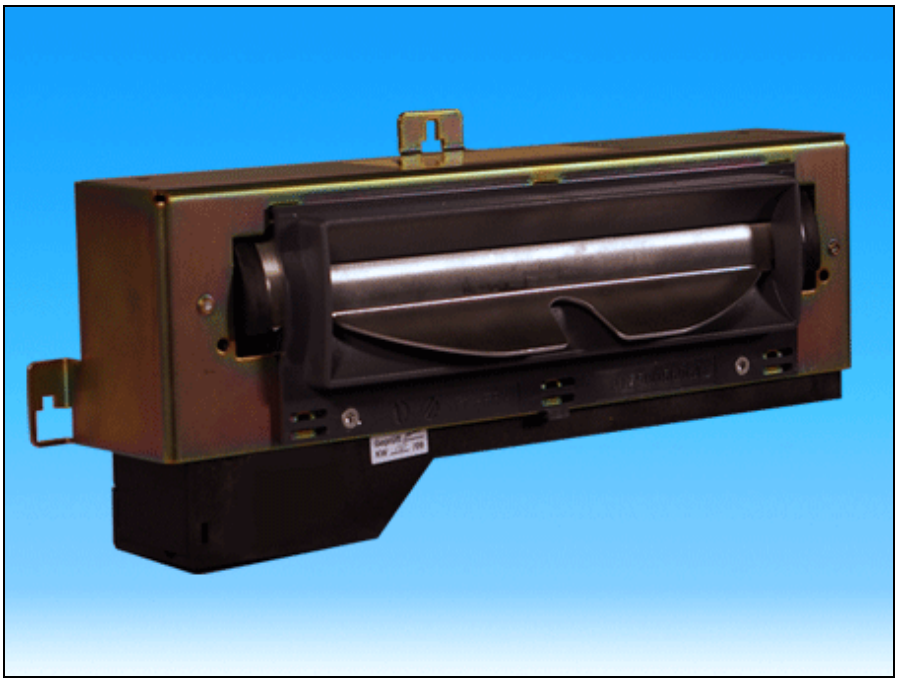
Designation	Part Number	Image
Shutter CMD V4 horizontal FL	01750082602	1
Shutter CMD V4 horizontal RL	01750082603	1
Shutter CMD V4 horizontal FL assy. w	01750085287	1
Shutter CMD V4 RL w assy.	01750128413	1
Shutter CMD V4 horizontal FL rail	01750136010	2
Shutter CMD V4 horizontal RL rail	01750136011	2
Shutter CMD V4 PC1521xe FL assy.	01750139331	1
Shutter CMD V4 FL weather. bent rail	01750178259	2
Shutter horiz. VBK 8x PC1500 FL	01750195729	1
Shutter CMD V4 RL weather. bent rail	01750195754	2
Shutter_PC1500xe_RL_VBK	01750205850	1
Shutter_horiz.VBK_8x_PC1500_FL_weather	01750210348	1
Shutter_horiz.VBK_8x_PC1500_RL_weather	01750210349	1

The following pictures are symbols for versions of the previously listed shutters. The characteristics of the individual shutters are not directly visible.

Illustration 1 Shutter CMD



Illustration 2 Shutter CMD rail



Installation

The shutter closes the cash output area of the Cash Media Dispenser (CMD) component and consists of the following components:

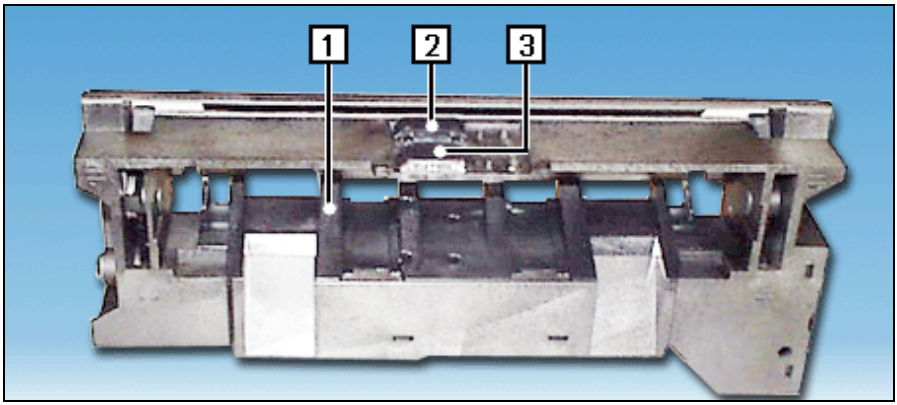
- Shutter flap (with or without rail)
- Drive mechanism with DC motor, gear mechanism and interlock mechanism
- 1 photo sensor for the provisioning of a note bundle to the output
- 1 photo sensor for the monitoring of the money withdrawal
- 2 sensors for the trapping device detection (VBK version only)
- Connector board with two hybrid photo sensors to control of the shutter flap

Both versions (Frontload and Rearload) differ only in the so called 'ramp' in the cash path and in the position of the photo sensors PS 27 and PS 28.

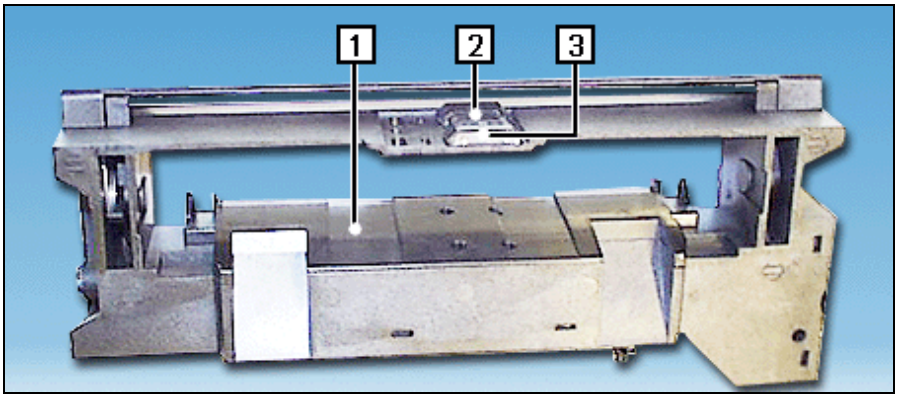
Views

CMD-V4 shutter

Rearload version view

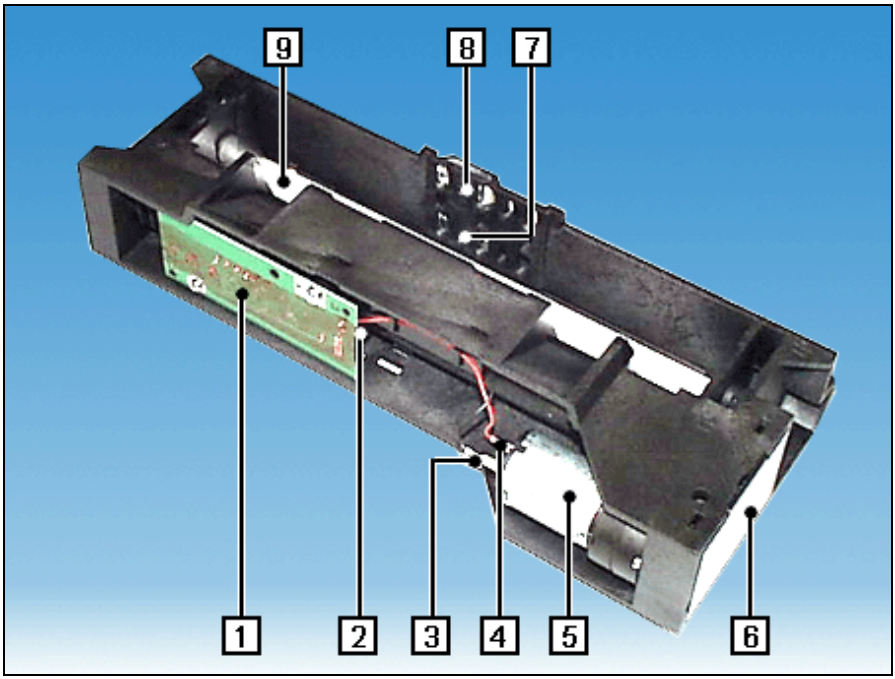


Frontload version view

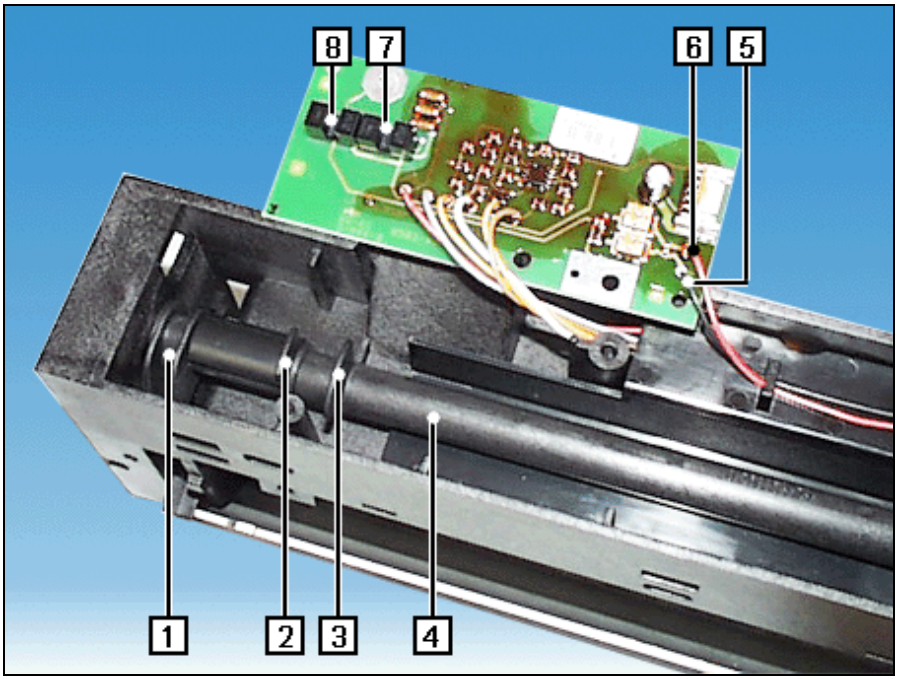


1 Ramp
2 Prism for the PS 27
3 Prism for the PS 28

The structure of the shutter is shown with the Rearload version as an example. The shutter structure is exactly the same in the Frontload version.



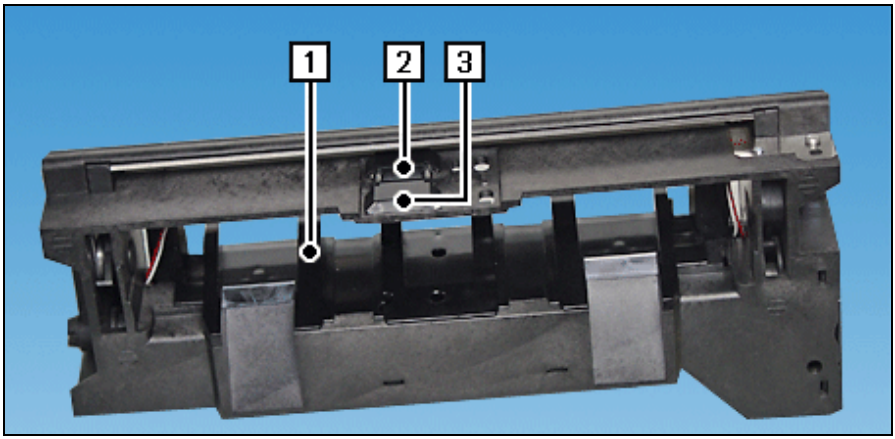
1 Electronics board
2 Connection plug
3 Motor connection (-)
4 Motor connection (+)
5 DC motor
6 Gear mechanism cover
7 Prism for the PS 27
8 Prism for the PS 28
9 Shutter flap



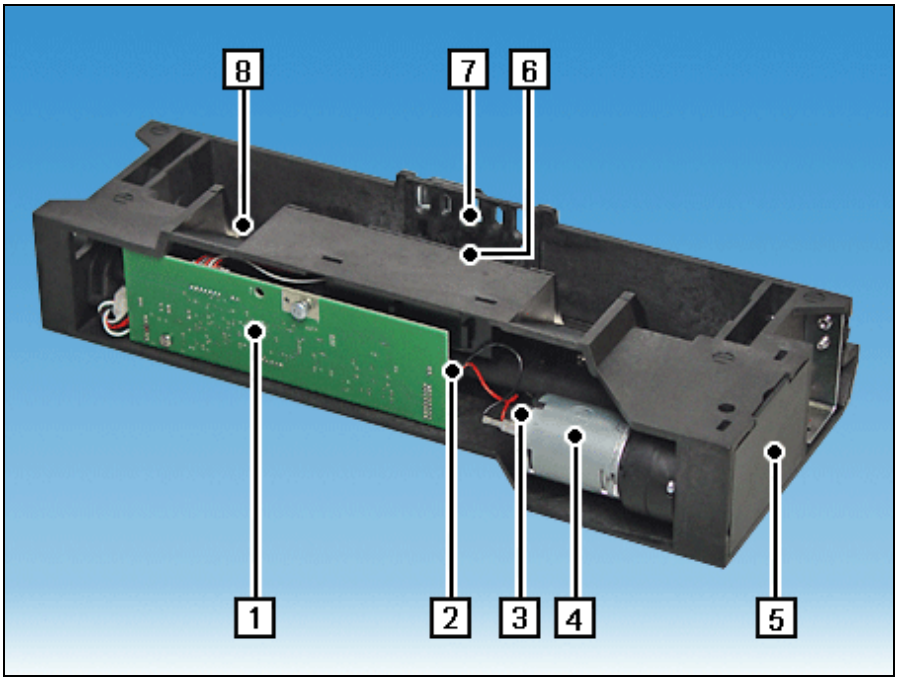
1 Moving and latching mechanism (left)
2 Switching flag for DPS 11
3 Switching flag for DPS 10
4 Drive shaft for shutter flap
5 Motor connection (-)
6 Motor connection (+)
7 Hybrid photosensor DPS 10
8 Hybrid photosensor DPS 11

CMD-V5 shutter

Rearload version view



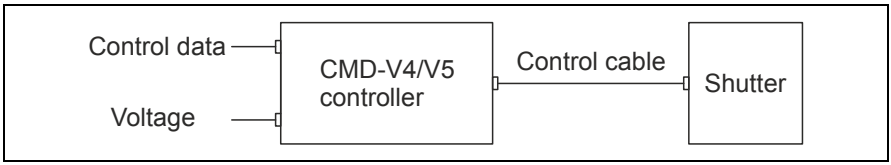
The structure of the shutter is shown with the Rearload version as an example. The shutter structure is exactly the same in the Frontload version.



1 Electronics board
2 Connection plug
3 Motor connection
4 DC motor
5 Gear mechanism cover
6 Prism for the PS 27
7 Prism for the PS 28
8 Shutter flap

Function

The shutter is controlled by the firmware of the CMD-V4/V5 controller and is triggered by the application software.



The firmware evaluates the signals of the photo sensors PS 27 and PS 28 as well as the hybrid photosensors DPS 10 and DPS 11 and controls the motor.

Photo sensor	Function
PS 27	Monitoring the banknote removal
PS 28	Clamp stop position to the banknote removal area
DPS 10 / DPS 11	Position of the drive shaft for the shutter flap

i The designation of the photosensor and the electronic signal are different (see the table in the section "Pin assignment").

The motor-driven shaft has a driving cam on the left and on the right side. They are constructed in such a way that the shutter is locked by the catches on the shutter flap bearings when the shutter is closed.

Shutter and drive mechanism are not directly connected.

When the driving cams turn, the shutter is forced open.

To close the shutter, the cam shaft turns the driving cams back but it is the spring that actually closes the shutter flap.

The latching mechanism of the shutter flap can only be performed if the flap is completely close beforehand.

This construction excludes the risk of injury for the user.

Banknote removal area CMD-V4

If the application triggers the command to dispense the banknotes, the shutter slap opens completely at first via the firmware. After the transportation of the banknotes into the removal position, the shutter flap closes slightly depending on the thickness of the banknote bundle. The thickness of the banknote bundle is evaluated by the thickness measurement in the CMD. The evaluated value functions as a temporary control of the drive motor.

After the withdrawal of the banknotes the shutter flap is opened completely by the firmware and the drive belts in the transport clamp are shortly running backwards. After that the shutter flap closes completely and locks, if there are not any external influences which get in the way.

Error code 28

If the locking procedure does not proceed in 1 second, the firmware turns off the motor, signals an error code (displays error code 28 on the CMD-V4 controller) and messages the malfunction to the application.

Error code 29 (manipulation protection)

If the closing shutter flap covers photo sensor PS 27, the error code 29 is shown on the display. The firmware tries anyway to close the shutter flap. If this is not possible during 1 second, the motor gets switched off.

Banknote removal area CMD-V5

The banknote removal in a system with a CMD-V5 is controlled by the application.

Meaning of the hybrid photosensors

DPS 10	DPS 11	ERROR
Open	covered	Shutter flap is completely open (position OPEN)
covered	covered	Shutter flap is opened (Position between OPEN and BANKNOTE DISPENSING)
covered	Open	The shutter flap is in the locking phase
Open	Open	Shutter flap is closed and locked (position CLOSED)

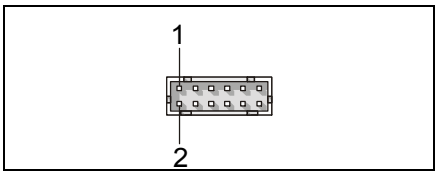
Signal level at the plug:

covered = 1 (H) = + 12 V

open = 0 (L) = 0 V

The level of the DPS 10 and DPS 11 are 0 V and 5 V, if the shutter electronics is connected to a CMD controller. If not, the measurement is not possible.

Pin assignment



Type of connector:
JST PHD 12M

Contact	Designation	Note
1		not used
2		not used
3	+ 12 V	
4	GND	
5	Motor (+)	Motor connection (+)
6	Motor (-)	Motor connection (-)
7	DPS 10	
8	DPS 11	
9	PS 27	
10	PS 28	
11	Transmit current PS 27 and PS 28	
12		not used

Firmware designation	Electronic signal
PS 27	LS 26
PS 28	LS 29

Maintenance

The shutter does not require preventive maintenance under normal operating conditions.

Technical Data

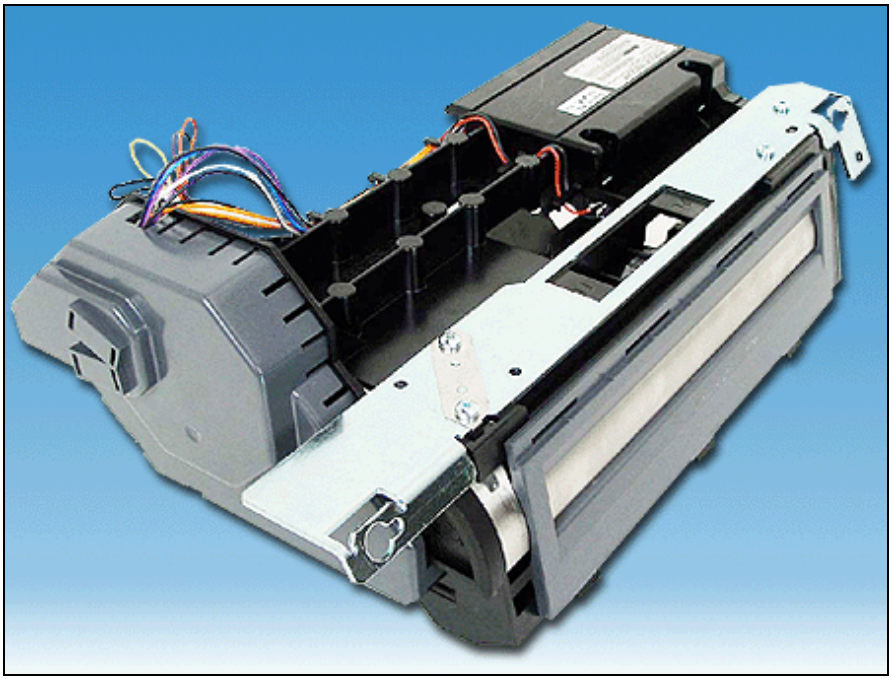
Dimensions:

Height:	128	mm	(5.04")
Width:	304	mm	(11.97")
Depth:	67	mm	(2.64")

Weight:	820	g	(1809 lb)

Shutter CMD vertical

Shutter CMD V4 vertical RL	01750045330
Shutter CMD V4 vertical FL	01750054768
Shutter 8x CMD FL	01750157286
Shutter 8x CMD RL	01750159971
Shutter protection 8x CMD FL	01750184934
Shutter protection 8x CMD RL	01750184935



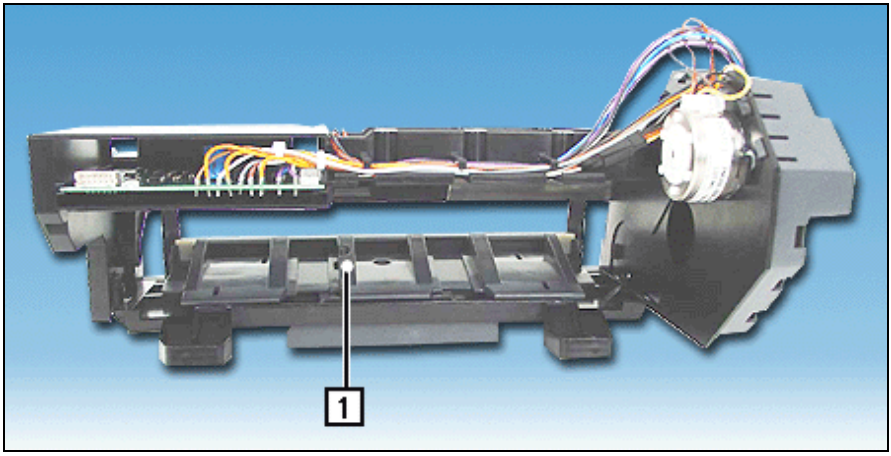
Structure

The shutter closes the cash output area of the Cash Media Dispenser (CMD) component and consists of the following components:

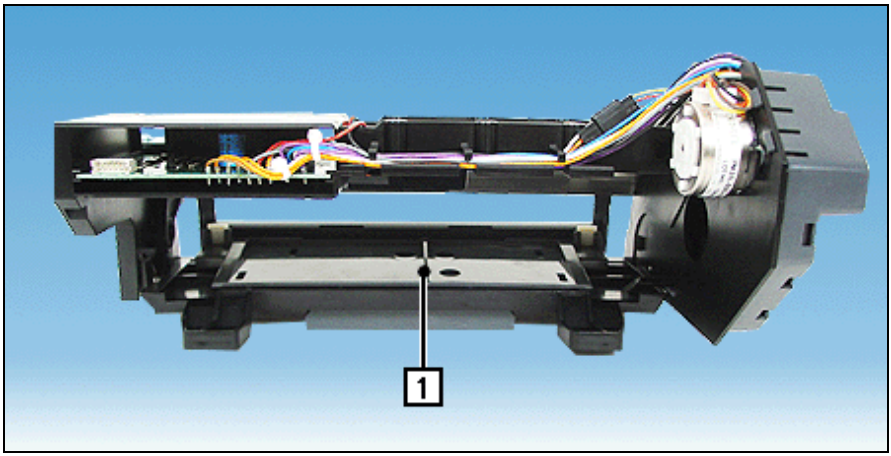
- Shutter flap
- Drive mechanism with stepper motor, gear mechanism, interlock mechanism and two hybrid photo sensors (DPS 10 and DPS 11) for monitoring the flap position.
- 1 photo sensor (PS 28) for the provisioning of a note bundle to the output
- 1 photo sensor (PS 27) for the monitoring of the money withdrawal
- Connector board for controlling the shutter flap

Both versions (Frontload and Rearload) differ only in the so called 'ramp' in the cash path and in the position of the photo sensors PS 27 and PS 28.

Rearload version rear view

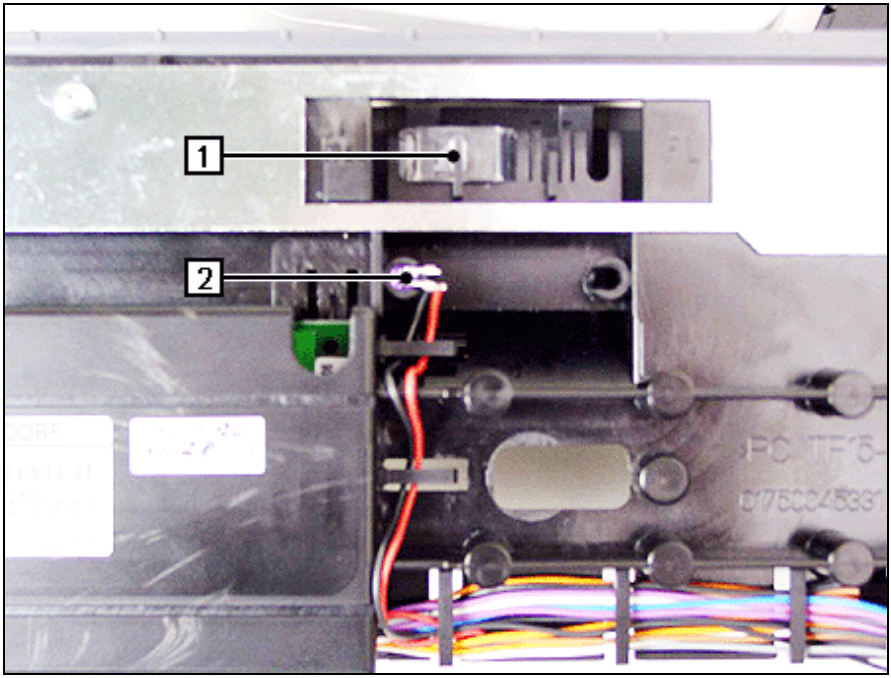


Frontload version front view



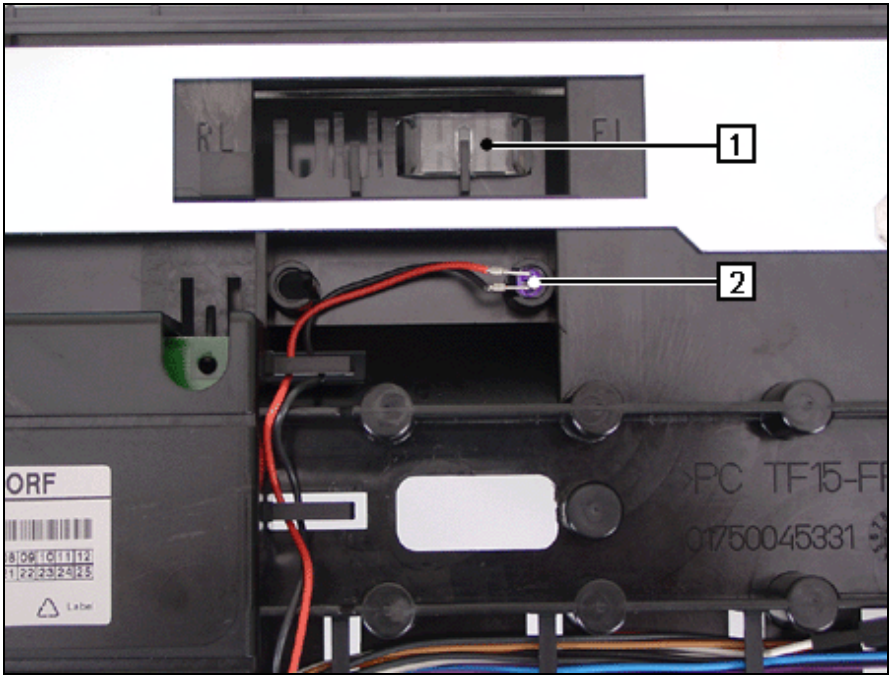
1 Ramp

Position of the photo sensors Rearload version



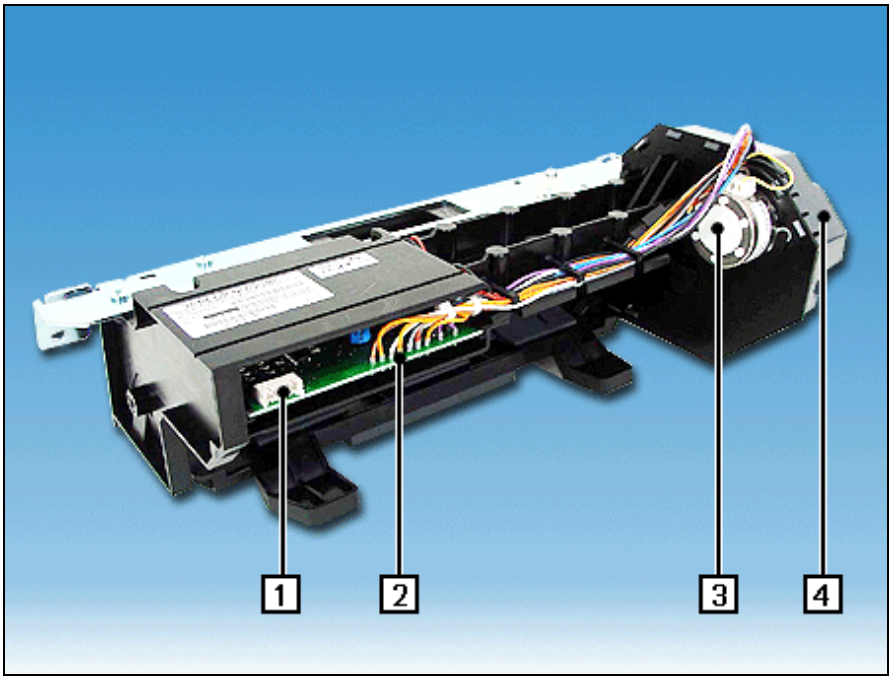
1 Prism for photo sensor PS 27 2 Photo sensor PS 28

Position of the photo sensors Frontload version

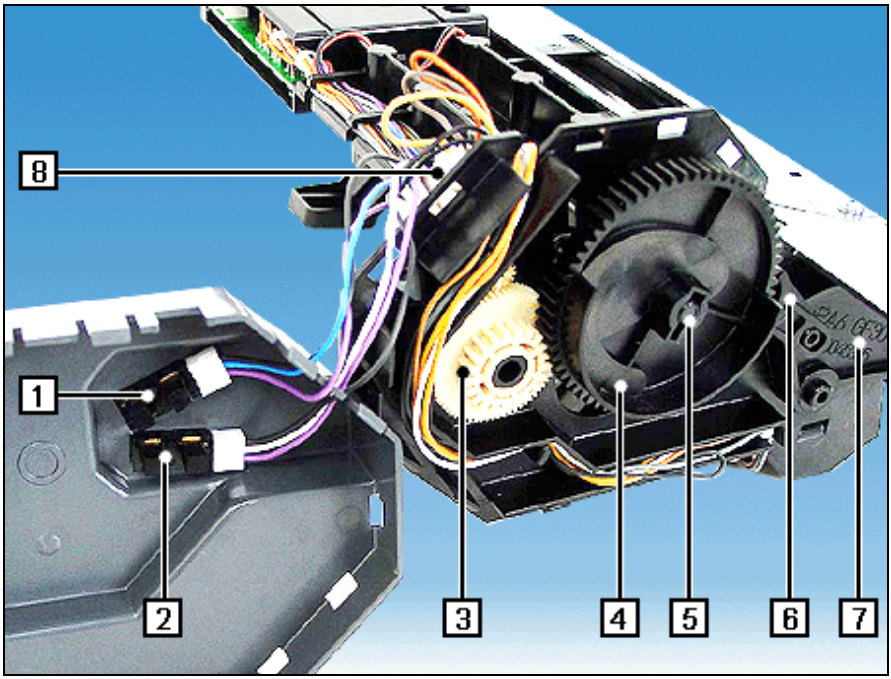


1 Prism for photo sensor PS 27 2 Photo sensor PS 28

i The additional structure of the shutter is shown with the Rearload version as an example. The shutter structure is exactly the same in the Frontload version.



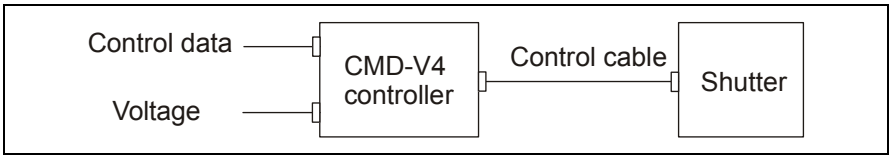
1 Connection plug
2 Electronics board
3 Stepper motor
4 Gear mechanism cover



1 Hybrid photo sensor DPS 11
2 Hybrid photo sensor DPS 10
3 Twin gear wheel
4 Switch actuator DPS 11 and DPS 10 at the cam disk
5 Cam disk
6 Lever
7 Side piece flap
8 Stepper motor

Function

The shutter is controlled by the firmware of the CMD-V4/V5 controller and is triggered by the application software.



The firmware evaluates the signals of the photo sensors PS 27 and PS 28 as well as the hybrid photo sensors DPS 10 and DPS 11 and controls the motor.

Photo sensor	Function
PS 27	Monitoring the cash dispensing
PS 28	Stop position of the gripper to the cash output
DPS 10 / DPS 11	Position of the drive shaft for the shutter flap

i The designation of the photo sensor and the electronic signal are different (see the table in the section "Pin assignment").

Shutter and drive mechanism are directly connected. When a cam disk turns, the shutter is forced to open or close. There is no risk for injury because the driving forces of the stepper motor are so low.

The latching mechanism of the shutter flap is performed automatically, if it is completely closed.

Cash dispensing CMD-V4

If the application triggers the command to dispense the money, the shutter slap opens completely at first via the firmware. After the transportation of the money into the removal position, the shutter flap closes slightly depending on the thickness of the banknote bundle. The thickness of the banknote bundle is evaluated by the thickness measurement in the CMD V4. The evaluated value functions as a temporary control of the drive motor.

After the withdrawal of the money the shutter flap is opened completely by the firmware and the drive belts in the transport clamp are shortly running backwards. After that the shutter flap closes completely and locks, if there are not any external influences which get in the way.

Error code 28

If the locking procedure does not proceed in 1 second, the firmware turns off the motor, signals an error code (displays error code 28 on the CMD-V4 controller) and messages the malfunction to the application.

Error code 29 (manipulation protection)

If the closing shutter flap covers photo sensor PS 27, the error code 29 is shown on the display. The firmware tries anyway to close the shutter flap. If this is not possible during 1 second, the motor gets switched off.

Cash dispensing CMD-V5

The cash withdrawal in a system with a CMD-V5 is controlled by the application.

Meaning of the hybrid photo sensors

DPS 10	DPS 11	Meaning
open	covered	Shutter flap is completely open (position OPEN)
covered	covered	Shutter flap is opened (Position between OPEN and CASH DISPENSING)
covered	open	The shutter flap is in the locking phase. Because of the slowing-down time which is contained in the firmware, it is guaranteed that the shutter flap is completely closed and locked (position CLOSED).

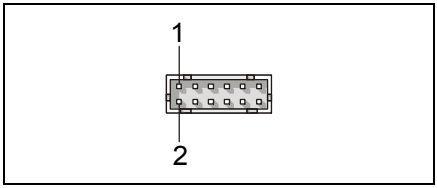
Signal level at the plug:

open = 1 (H) = + 12 V

covered = 0 (L) = 0 V

The level of the DPS 10 and DPS 11 are 0 V and 5 V, if the shutter electronics is connected to a CMD controller. If not, the measurement is not possible.

Pin assignment



Type of connector:
JST PHD 12M

Pin	Description	Remarks
1	+ 24 V	
2	GND	Load for + 24 V
3	+ 12 V	
4	GND	
5	Motor (+)	Stepper motor On / Off *1)
6	Motor (-)	Rotation direction of the stepper motor forwards / backwards *1)
7	DPS 10	
8	DPS 11	
9	PS 27	
10	PS 28	
11	Transmit current PS 27 and PS 28	
12		not used

*1) These two signals from the CMD V4/V5 controller are processed through a clock generator on the controller card of the shutter into clock signals for the stepper motor.

Firmware description	Electronic signal
PS 27	LS 27
PS 28	LS 28

Maintenance

The shutter does not require preventive maintenance under normal operating conditions.

Technical data

Dimensions:			
Height:	127	mm	(5")
Width:	337	mm	(13.3")
Depth:	185	mm	(7.28")
Weight:	1020	g	(2250 lb)

Ink Staining System

The cash media dispenser (CMD-V4) can be equipped with two different ink staining systems.

If an ink staining system is installed read the respective service manual which is supplied with the device:

- Ink staining system SQS: 01750094340
- Ink staining system Villiger: 01750094337

Printing Cassette (TH60)

Printing cassette (TH60)	01750092160
Printing cassette (TH60)	01750109482

The printing cassette is an optional component of the CMDV4 and is used to print documents and labels. It is part of a dual dispenser module.

The TH60 is a thermal printing unit with an integrated paper cutter, and is installed in the printing cassette. It is a compact unit for direct printing on thermal paper.

The TH60 features a thermal printing unit that is 160 mm (6.3") wide and operates at 8 dots/mm.

Paper is fed by two stepper motors.

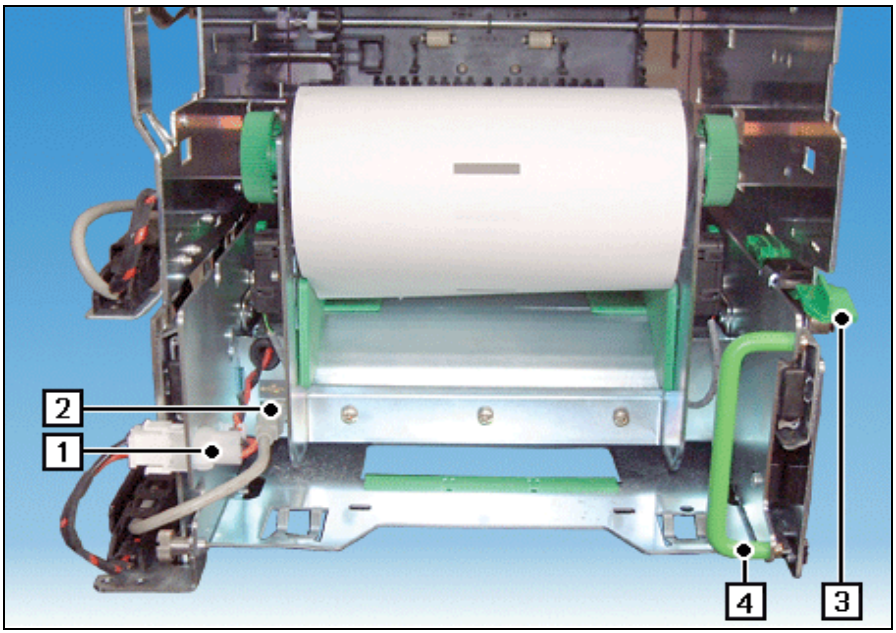
Various sensors and switches control this operation.

One sensor identifies the black mark that is on the back of the thermal paper.

The TH60 controller uses a temperature sensor to monitor the thermal line.

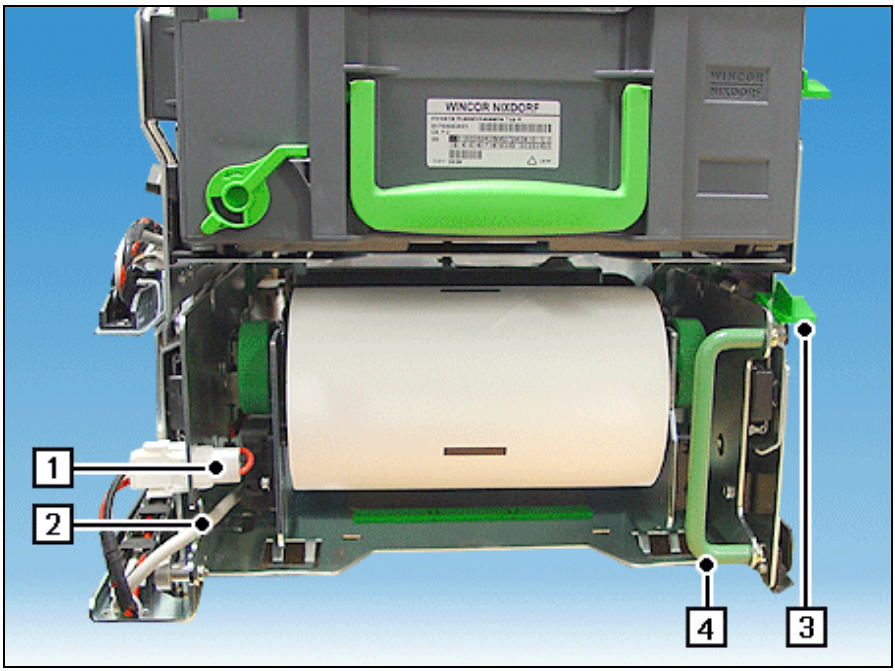
This description supplements the CMDV4 manual.

View of printing cassette (large paper roll)



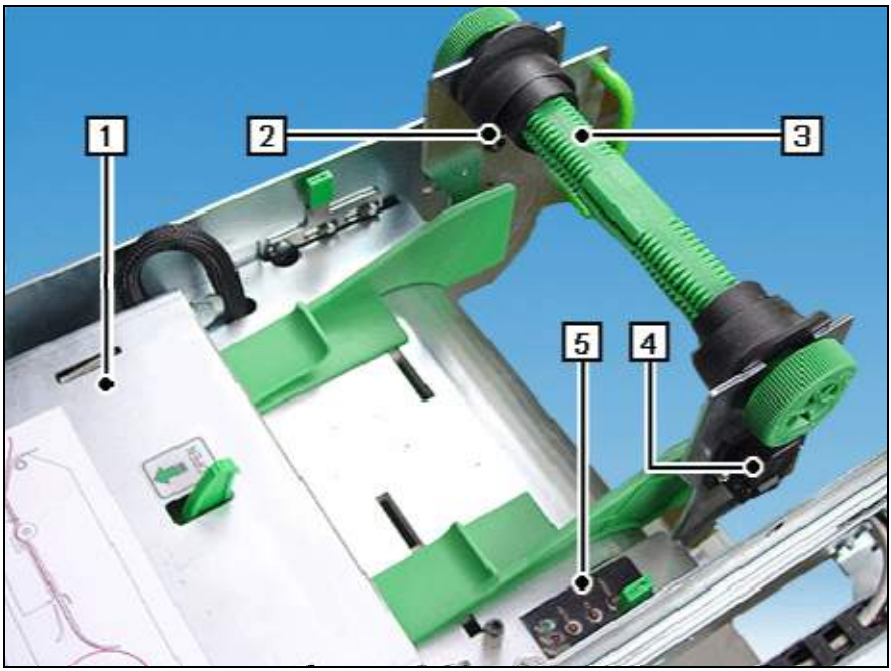
1 24 V power supply
2 USB port
3 Locking/unlocking lever
4 Handle to pull out/push in the printing cassette

View of printing cassette (small paper roll)



1 24 V power supply
2 USB port
3 Locking/unlocking lever
4 Handle to pull out/push in the printing cassette

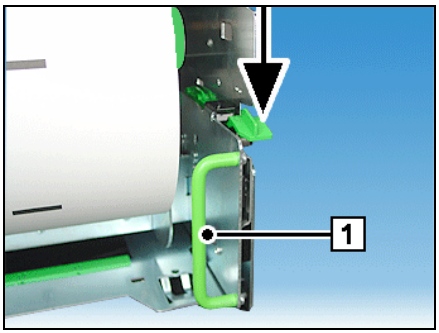
Components and controls



1 Thermal printing unit with paper cutter
2 Paper-nearly-out receiver
3 Paper roll holder
4 Paper-nearly-out transmitter
5 Keypad

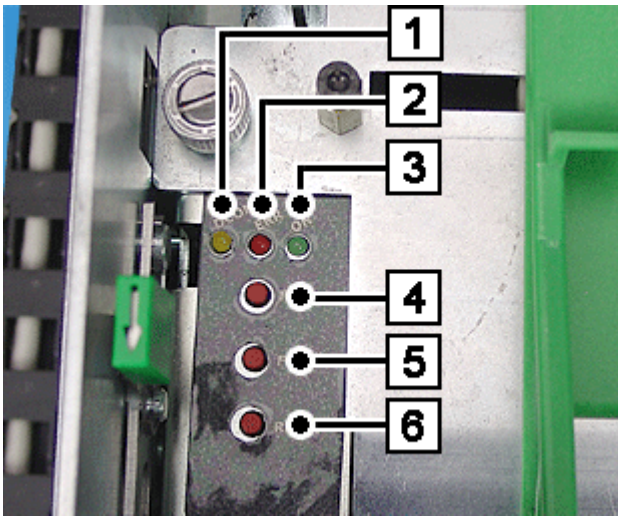
Pulling out the printing cassette

- Launch the product-specific software (see chapter “Basic Operation”, section “Calling the product-specific software” in the operating manual).
- Open the safe door (see chapter “Basic Operation”, section “Opening/closing the safe door (with factory setting)” or “Opening/closing the safe door (with customized lock)” in the operating manual).



Press the green unlocking lever down (see arrow), and pull the printing cassette out of the CMD V4 using the green handle (1).

Keypad



1 Yellow status LED
2 Red status LED
3 Green status LED
4 F1 key - paper feed
5 F2 key
6 RESET key

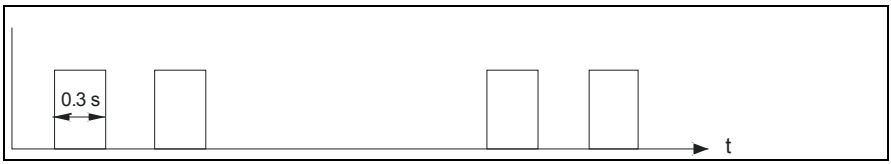
Errors/faults

The yellow or red status LED flashes if an error occurs. This does not include faults that cause the controller to stop functioning.

Status indications

The yellow or red status LED flashes if an error occurs, for example flashing briefly twice in succession. The LED is then switched off for 0.5 second, and the cycle is repeated (see the diagram “Example of a 2-flash indication”).

Example of a 2-flash indication



Yellow status LED

This LED indicates the status of data communication.

Flash cycle	Cause	Action
1	Data reception	
2	Communication error	
3	Data communication not completed	
4	USB port error	

Green status LED

This LED indicates the general device status.

Flash cycle	Cause	Action
0	Printer is ready	
2	Document is in the output unit	Remove the document

Red status LED

This LED indicates the general error status of the printing cassette.

Flash cycle	Cause	Action
1	End of paper	Insert a new paper roll (see chapter “Printing Cassette”, section “Replacing the paper roll” in the operating manual).
2	Near end of paper	The paper roll must be replaced soon.
3	Paper jam	Eliminate the paper jam (see chapter “Printing Cassette”, section “Removing a paper jam” in the operating manual).
4	Fault in cutter	Check the blades. If the fault remains, replace the printing cassette (see the section “Installing/removing components”).
5	Thermal line raised	Close the thermal line (see chapter “Printing Cassette”, section “Removing a paper jam” in the operating manual).
6	Power supply fault	Check the power supply unit or the controller. If the fault remains, replace the printing cassette (see the “Installing/removing components” section).
7	Overheating	Switch the device off and let it cool down.
8	Memory error	Replace the printing cassette (see the section “Installing/removing components”).
9	EEPROM error	Replace the printing cassette (see the section “Installing/removing components”).

Key functions

The following key functions are available to test the printing unit.

- Paper feed – press the F1 key
- Trial printout (fonts) – press the F1 and RESET keys, then release RESET while continuing to hold F1 down.
- Setup menu and printout of setup report – press the F2 and RESET keys, then release RESET while continuing to hold F2 down.

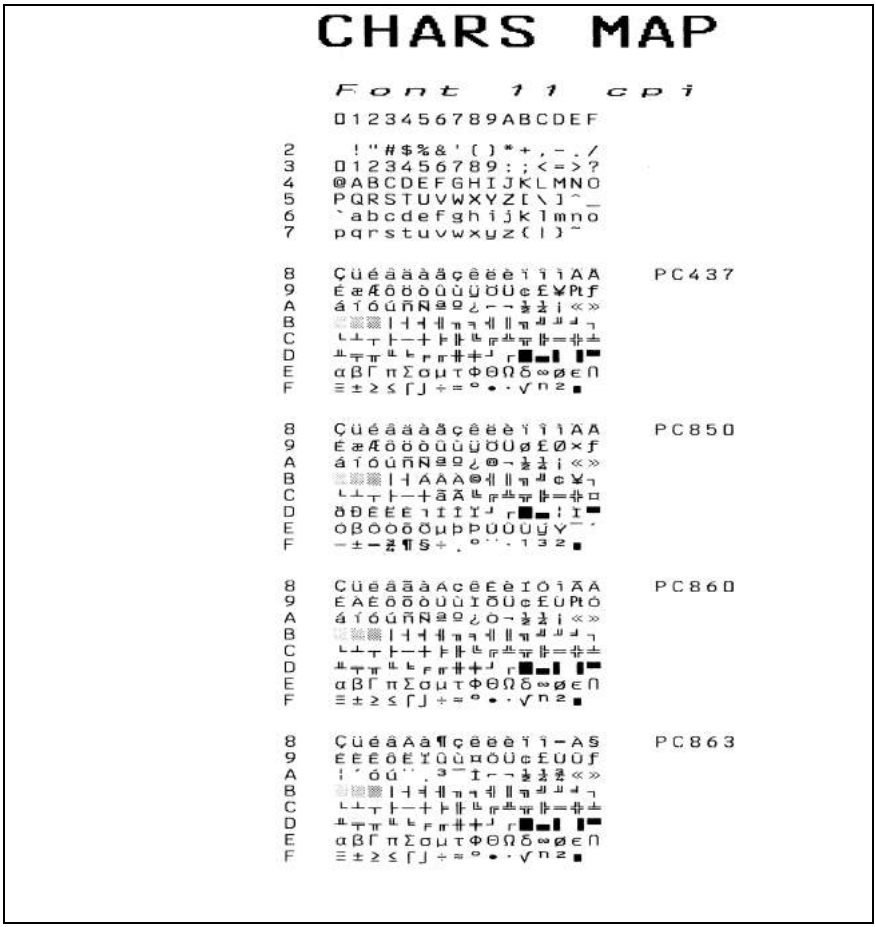
Paper feed

- Press the paper feed key (F1). The printer feeds the paper and then cuts it.

Trial printout

- Press the RESET and F1 keys at the same time. Release RESET while continuing to hold F1 down for several seconds. The printer outputs a trial printout showing the fonts.

i It is advisable to use normal thermal paper with a width of 150 mm / 5.91" for the trial printout.



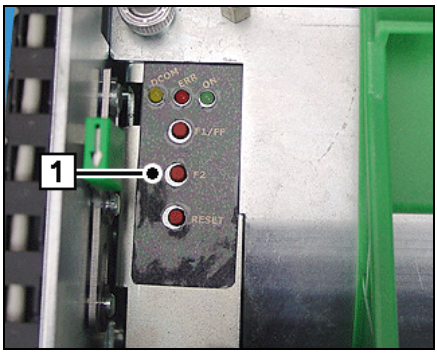
Ending the key function

- Press the RESET key to exit the key function.

Setup menu

Only print the setup menu on thermal paper because printing extends beyond the margin when labels are used.

The status report is triggered as follows.



F2 key (1)

Press the RESET and F2 keys at the same time. Release RESET while holding F2 down for several seconds.

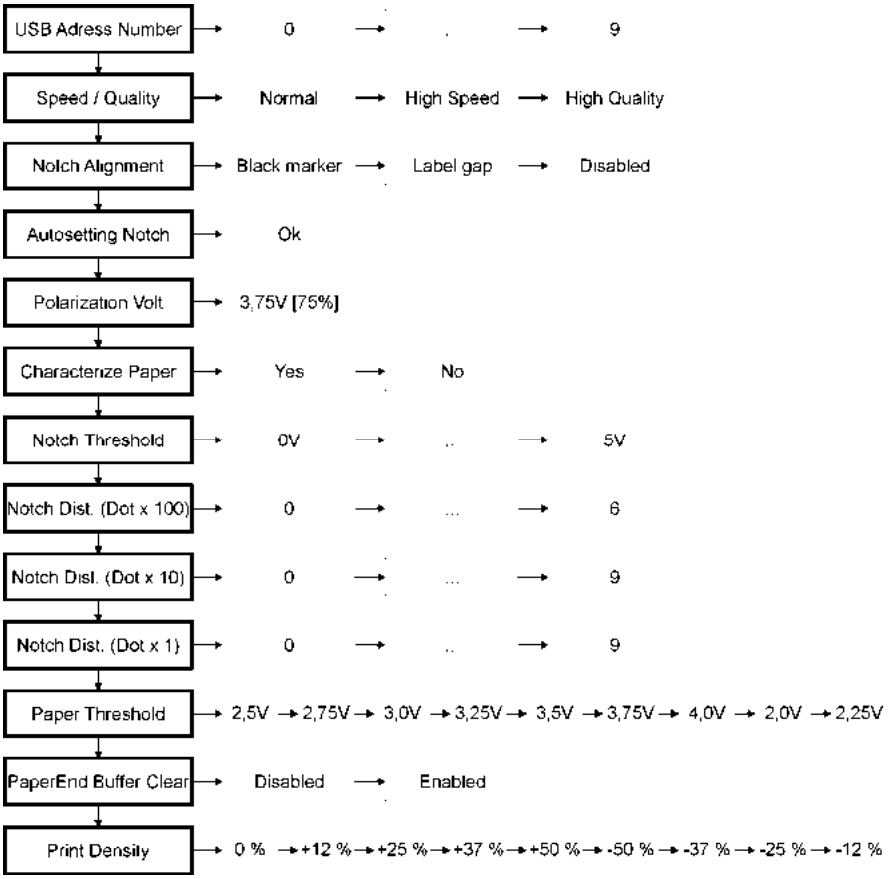


- You can select and change the menu items via the F2 key.

i The settings are saved automatically; they cannot be rejected. If an input error is made, the menu item must be selected again and changed.

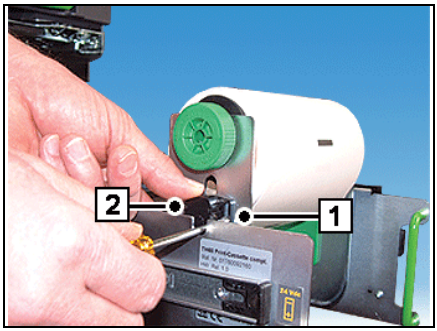
- You can go to the next menu item with the F1 key.
- You can end menu settings at any time by pressing RESET.

Menu structure



Adjusting the paper-nearly-out sensor

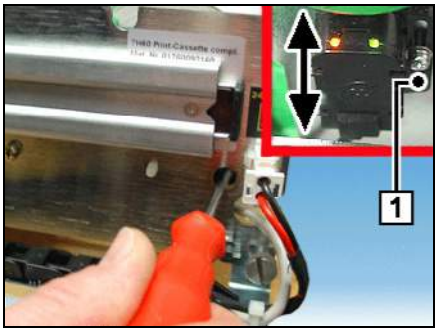
- Pull the printing cassette out of the CMDV4 (see the “Pulling out the printing cassette” section).



Large roll:

Undo the screw (1) on the right side of the paper-nearly-out sensor (2).
Push the paper-nearly-out sensor up or down.

Up = Respond later
Down = Respond earlier

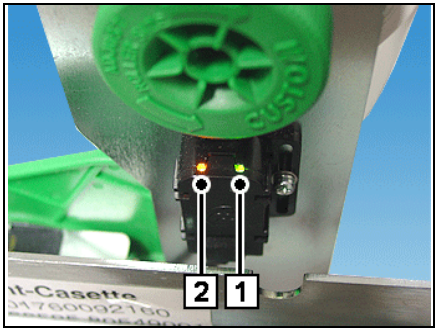


Small roll:

Undo the screw (1) on the right side of the paper-nearly-out sensor.
Push the paper-nearly-out sensor up or down.

Up = Respond later
Down = Respond earlier

Status LEDs



LEDs:

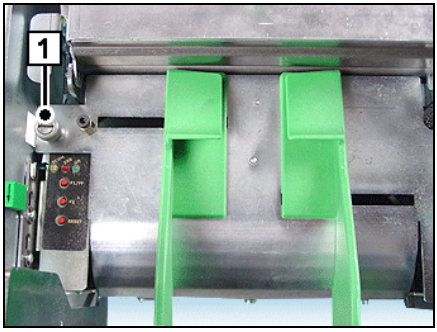
Green (1) on = OK, there is enough paper.

Yellow (2) also on = The paper is running out.
A message is sent to the application.

Installing/removing components

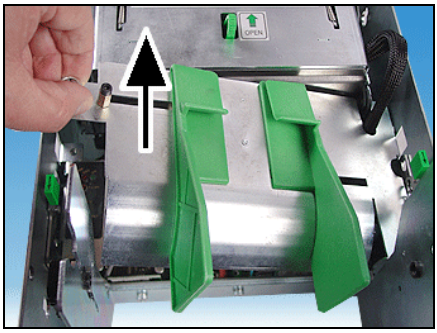
Thermal line with blade

- Pull the printing cassette out of the CMDV4 (see the section “Pulling out the printing cassette”).
- Switch the Cash Media Dispenser Version 4 off (see chapter “Basic Operation”, section “Switching off the device” in the operating manual), and unplug the power plug.

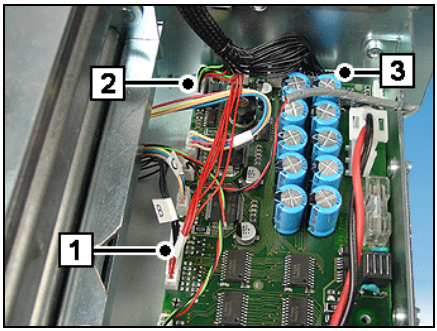


Undo the screw (1)

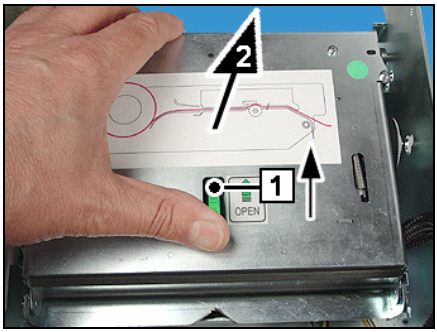
Push the paper guides completely together.



Remove the controller cover from the stay bolt by lifting it at a slant (see arrow).

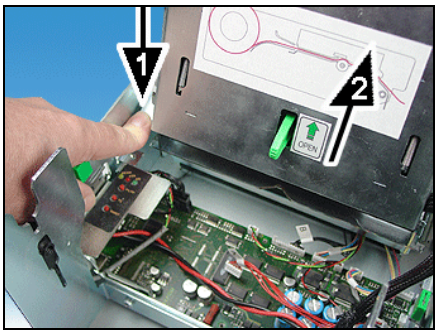


Detach connectors (1) to (3).



Press the retaining lever (1) in the direction of the arrow.

Tilt the thermal array upward in the direction of the arrow (2).



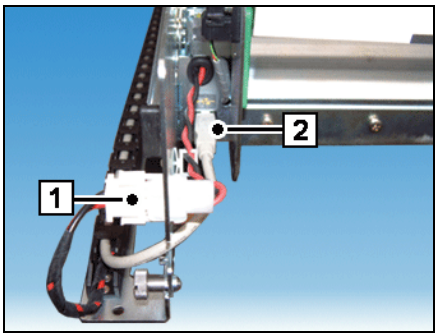
Press the retaining lever (1) in the direction of the arrow.

Lift the thermal array out.

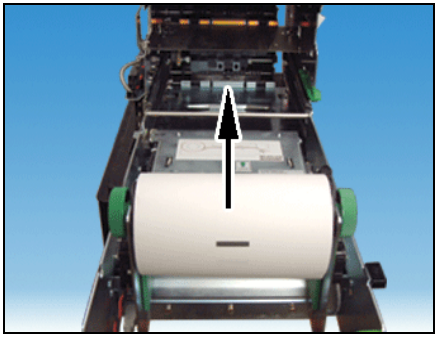
- Installation is in reverse order for removal.

Removing the printing cassette

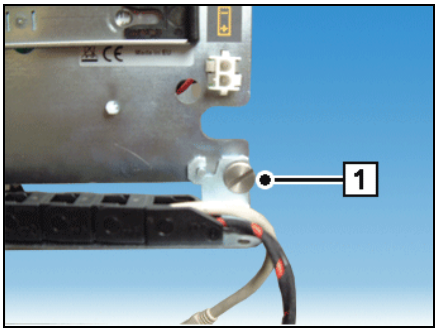
- Pull the printing cassette out of the CMDV4 (see the section “Pulling out the printing cassette”).
- Switch the Cash Media Dispenser Version 4 off (see chapter “Basic Operation”, section “Switching off the device” in the operating manual), and unplug the power plug of the Cash Media Dispenser Version 4.



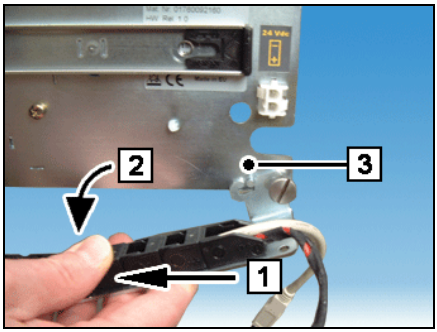
Detach connectors (1) and (2).



Lift the paper roll out (see arrow).

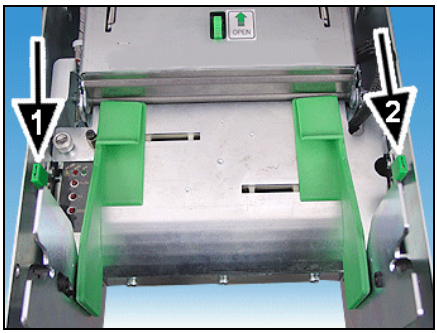


Loosen the knurled screw (1) by a few turns.

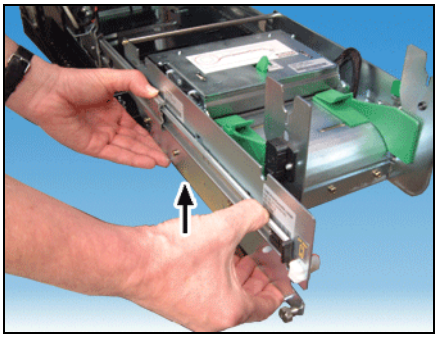


Push the cable chain with the retaining bracket in the direction of the arrow (1).

Turn the cable chain out of the retaining mechanism (3) in the direction of the arrow (2), and detach it.



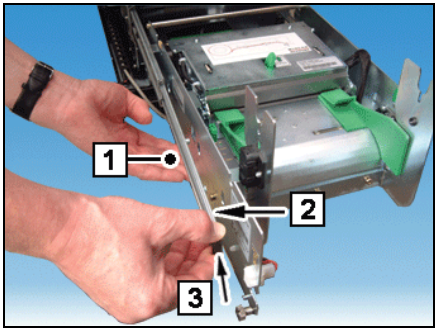
Press the locking levers (1) and (2) in the direction of the arrow as far as possible.



Hold the telescopic runner tight with your thumbs.

Press the printing cassette upward out of the retaining mechanism in the direction of the arrow

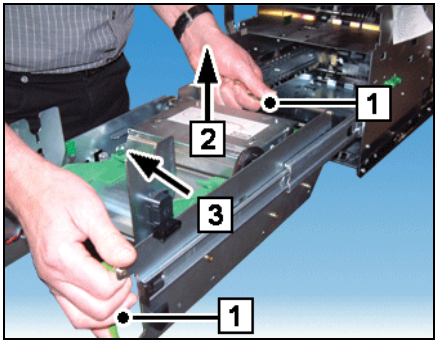
and ...



... support the printing cassette (1).

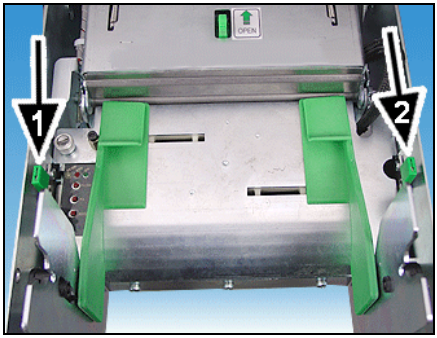
Pull the telescopic runner away from the printer in the direction of the arrow (2).

Push the telescopic runner into its holder in the direction of the arrow (3) as far as possible.



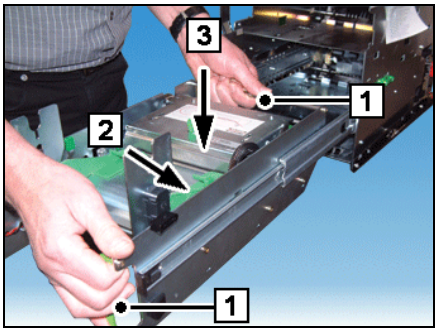
Lift the printing cassette by its two handles (1) in the direction of the arrow (2), and remove it in the direction of the arrow (3).

Installing the printing cassette



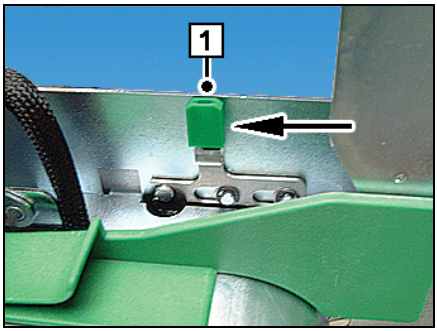
i When installing the new printing cassette, make sure that the locking levers (1) and (2) have been pushed in the direction of the arrow as far as possible.

- Pull the right-hand telescopic runner completely out of the Cash Media Dispenser Version 4.

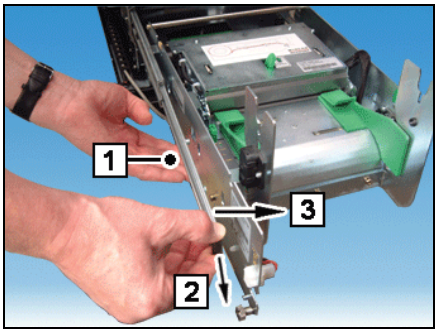


Lift the printing cassette by its two handles (1) in the direction of the arrow (2), and place it on the existing locating bolts.

Carefully lower the printing cassette in the direction of the arrow (3).



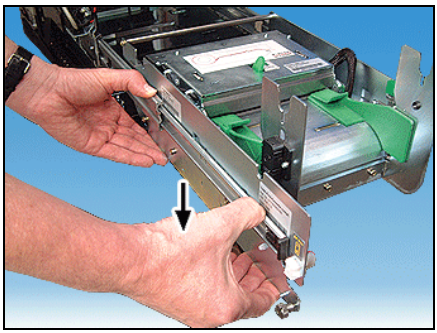
Push the right-hand locking lever (1) in the direction of the arrow as far as possible.



Support the printing cassette (1).

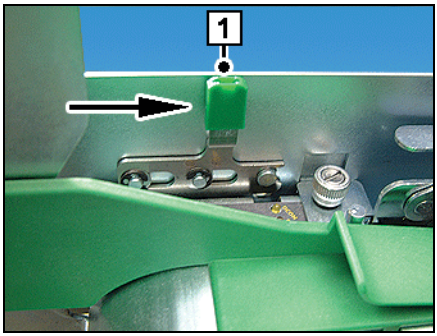
Pull the telescopic runner in the direction of the arrow (2) as far as possible.

Push the telescopic runner on to the locating pins in the direction of the arrow (3).

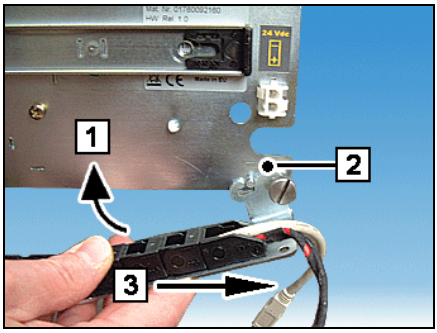


Hold the telescopic runner tight with your thumbs.

Press the printing cassette upward out of the retaining mechanism in the direction of the arrow



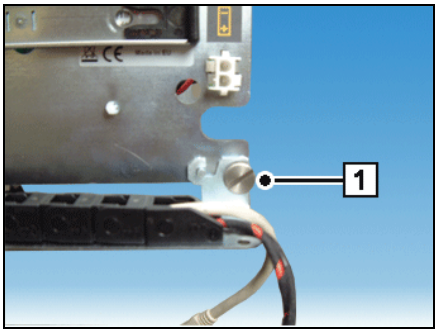
Push the left-hand locking lever (1) in the direction of the arrow as far as possible.



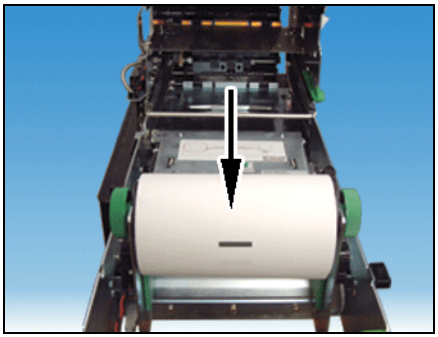
Twist the cable chain around the retaining mechanism (2) in the direction of the arrow (1).

Push the cable chain with the retaining bracket in the direction of the arrow (3)

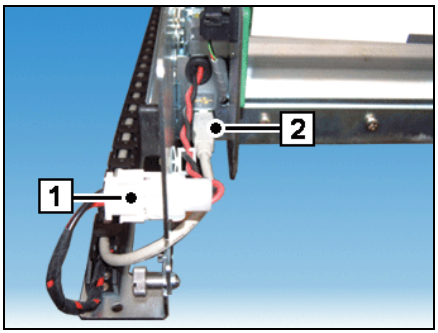
and ...



… tighten the knurled screw (1) again.



Now reinsert the paper roll in the direction of the arrow.



Re-attach connectors (1) and (2).

- Insert the power plug in the device socket, and switch the Cash Media Dispenser Version 4 on.
- Push the printing cassette into the CMDV4 until it locks into place.
- Close the Cash Media Dispenser Version 4.

Technical data

Power supply

Power supply:	24 V DC ± 10%
Connector:	AMP Mod I 2-pin

Power consumption

Stand-by 24 V DC:	approx. 0.2 A
Operating mode 24 V DC:	approx. 9.0 A
Peak current 24 V DC:	approx. 20 A

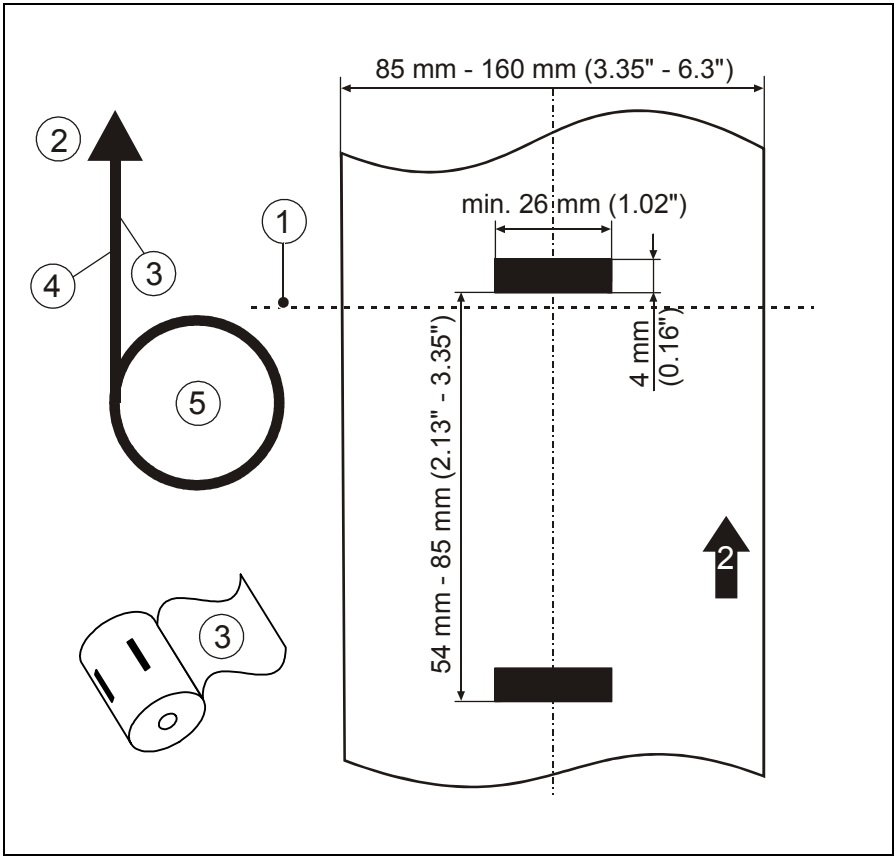
Printing data

Printing method:	direct thermal printing
Resolution:	8 dots/mm or 200 DPI

Thermal paper specifications

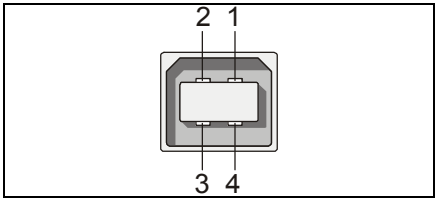
Paper width	85 mm - 160 mm ± 1 mm (3.35 - 6.3" ± 0.04")
Paper thickness	0.08 - 0.16 mm (0.003 - 0.01")
Paper weight	100 g/m² - 120 g/m² (26.67 lb - 32 lb)
Paper smoothness at front	min. 300 Bekk sec.
Paper smoothness at back	max. 200 Bekk sec.
Evenness of side walls of paper roll	±1 mm (± 0.04")
Thermal coating	on the inside
Outer diameter of large paper roll	up to 180 mm (7.09")
Outer diameter of small paper roll	up to 120 mm (4.72")
Inner diameter of roll core	50 + 1 mm (1.97" + 0.04")
Roll core material	plastic or cardboard
Thickness of roll core wall	min. 2 mm + 1 mm (min. 0.08" + 0.04")
End of paper	The end must not be glued to the roll core.
Mark position	on the back, in the middle
Mark color	black (not colored)
Mark height	min. 4 mm + 0.5 mm (min. 0.16" + 0.02")
Mark width	min. 26 mm + 0.5 mm (min. 1.02" + 0.02")
Mark spacing	min. 54 mm - max. 85 mm (min. 2.13" - max. 3.35")
Mark reflection	> 70% acc. to DIN 53145 part 1
Mark PCS value	> 70% acc. to DIN 66 236
Opacity	> 85% acc. to DIN 53 146
Paper quality	OJI KF 50-HDA

Rear of paper web



1 Cutting edge
2 Unroll direction
3 Inner surface of paper web (heat-sensitive)
4 Reverse of paper (mark position)
5 Paper roll

USB pin assignment

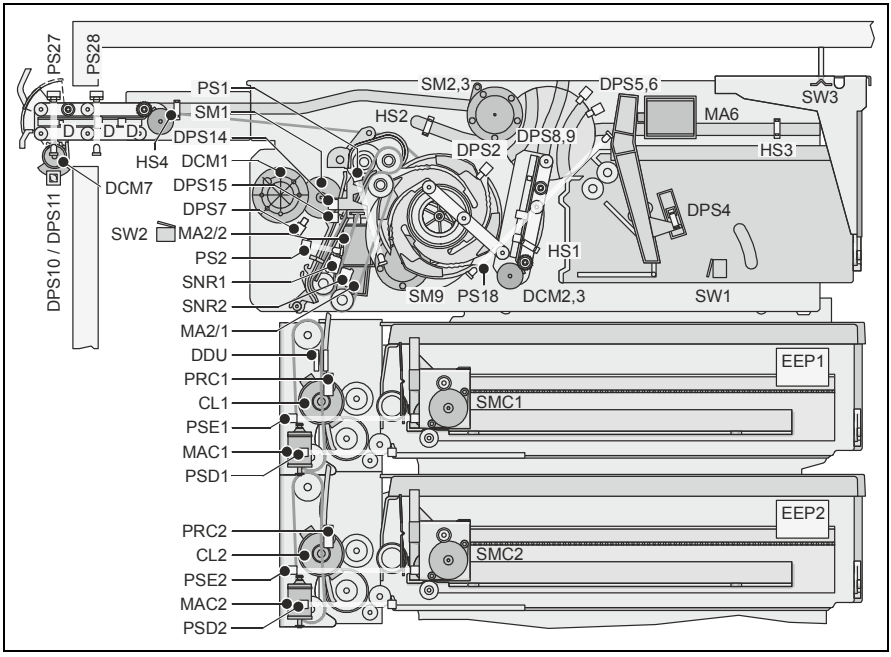


Type of connector:
USB 4-pin

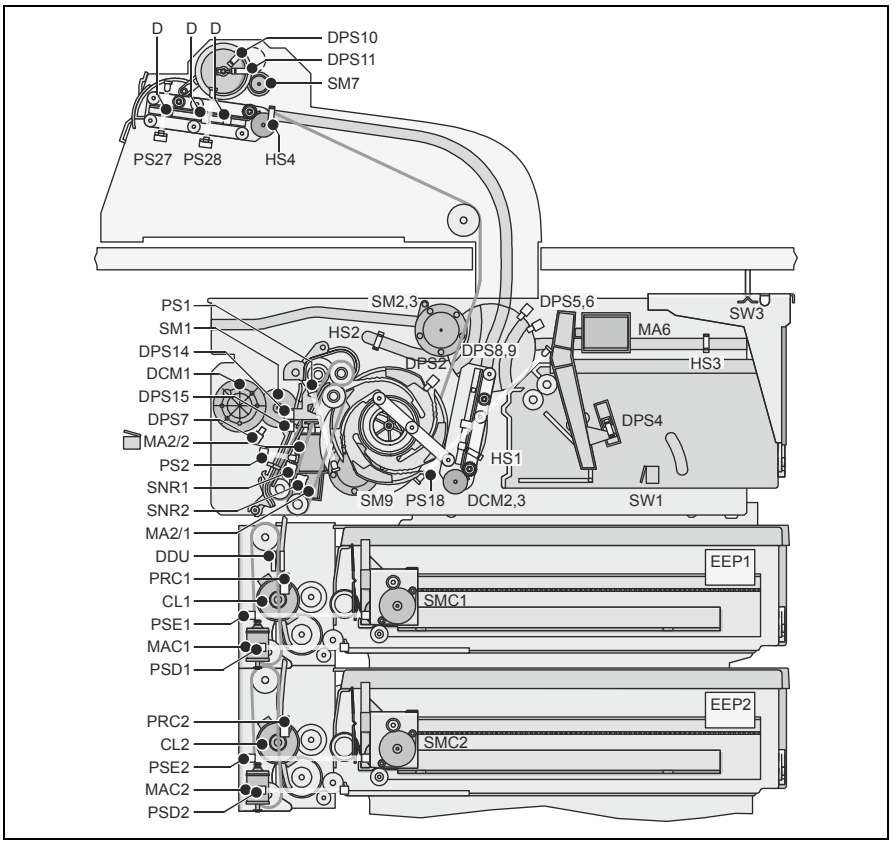
Pin	Designation	Input/output	Function
1	VBUS		
2	D-	Bidirectional	Data
3	D+	Bidirectional	Data
4	GND	Bidirectional	
Shield	Shield		

Sensors and electromechanical components

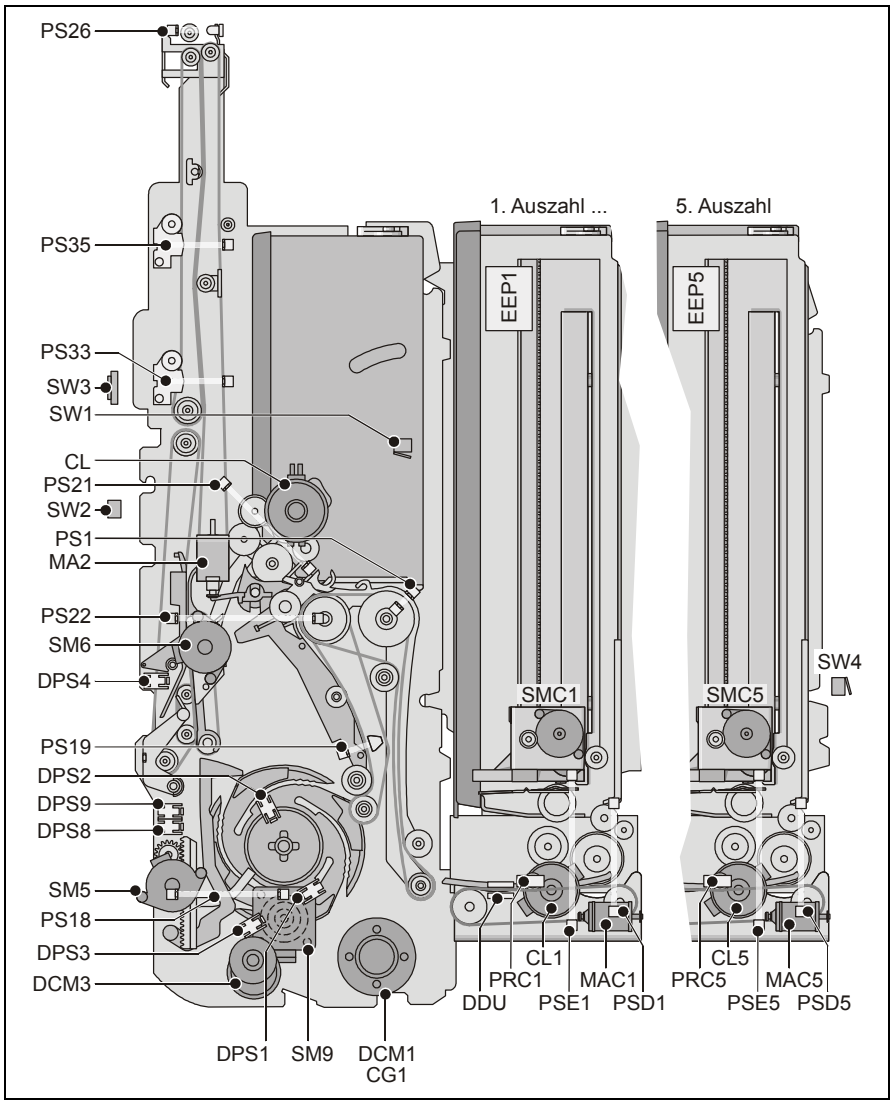
CMD-V4 with horizontal output transport RL



CMD-V4 with vertical output transport



VCMD with vertical output



Meaning of abbreviations and symbols

Electrical elements

Stacker and output transport

Component	Name	Location
D	Permanent magnets (3 units) – without sensors	Clamp
DPS 2	Stacker wheel position query	Stacker wheel input
DPS 4	Sensor: position of retract compartment	RR box
DPS 5	Sensor: home position	Routing disk drive, left
DPS 6	Sensor: home position	Routing disk drive, right
DPS 7	Home position of sliding surface	Single reject
DPS 8	Sensor: Position	Routing disk drive, left
DPS 9	Sensor: Position	Routing disk drive, right
DPS 10	Hybrid photosensor	Shutter
DPS 11	Hybrid photosensor	Shutter
DPS 14	Home position of switch	Single reject
DPS 15	Switch position: single reject	Single reject
SNR 1	Scanning bar Serial Number Recognition	Stacker wheel input
SNR 2	Scanning bar Serial Number Recognition	Stacker wheel input
HS 1	Home position (Hall-Sensor)	Clamp positioning
HS 2	Initial RR position (behind the routing disk) (Hall-Sensor)	Clamp positioning
HS 3	Reversal in FL direction (if required.) (Hall-Sensor)	Clamp positioning
HS 4	Stop over position and final position of clamp(Hall sensor)	Clamp positioning
PS 1	Stacker wheel input	Stacker wheel input
PS 2	Tray empty' check	Single reject
PS 18	Tray monitoring/ input monitoring 'clamp empty'	Swivel drive for clamp flap/RR box

Component	Name	Location
PS 27	Removal photosensor	Clamp positioning
PS 28	Bundle rear edge control	Clamp positioning
DCM 1	Main drive motor	Stacker wheel input
DCM 2	Traction motor + planetary gears	Clamp
DCM 3	Belt drive + planetary gears	Clamp
DCM 7	DC motor (Outdoor)	Shutter
MA 2/1	Switch control magnet	Single reject
MA 2/2	Switch control magnet	Single reject
MA 6	Magnet for retract comportment	Reject box
SW 1	RR box inserted	Reject box
SW 2	Safety switch	Slide rack
SW 3	Locking handle	Release lever
SM 1	Pressure on sliding surface for emptying	Single reject
SM 2	Routing disk motor	Routing disk drive, left
SM 3	Routing disk motor	Routing disk drive, right
SM 7	Stepper motor (Indoor)	Shutter
SM 9	Stacker wheel stepper motor	Stacker wheel input
T 1	Timing disk	Stacker wheel input

Dispenser module I

Compo-nent	Name	Location
MACx	Retaining magnet	Dispenser module; cassette x x = 1 – 6
CLx	Extractor gear	Dispenser module; cassette x x = 1 – 6
PSDx	Dispensing sensor	Dispenser module; cassette x x = 1 – 6
PSEx	Empty sensor	Dispenser module; cassette x x = 1 – 6
DDU	Length measurement, measuring station	Top dispenser module
SMCx	Stepper motor for pressure	in cassette x x = 1 – 6
PRCx	Pressure sensor	Dispensing unit; cassette x x = 1 – 6
EEPx	EEPROM	at cassette x x = 1 – 6

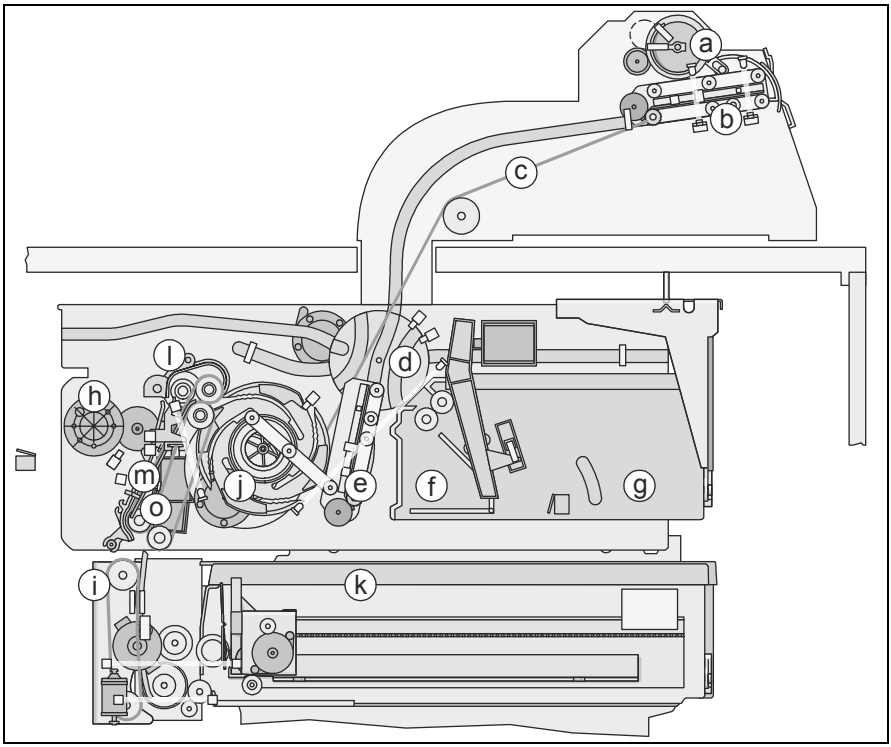
Stacker and output transport VCMD

Component	Designation	Location
CG1	Clock oscillator for speed control and width measuring of the notes	at main motor DCM1
CL	Coupling for the drive of the reject cassette	
CL1	Coupling with built-in brake for note dispensing (1st cash-out cassette)	
DCM 1	Function 1: Main drive motor for dispensing and collecting individual notes and for their banknote transport into the reject cassette	Stacker wheel input
	Function 2: Drive for the output transport of the bundle to the customer, in addition to note retraction from stacking compartment into the reject cassette	
DCM 3	Drive for the finger-type pressure bar and switching of the motor DCM1 between Function 1 and Function 2	Clamp
DCM 7	Shutter drive, shutter flap	Shutter
DPS 1	Finger-type pressure bar in the stacking compartment in home position for dispensing	Stacker input
DPS 2	Stacker wheel position query	Stacker wheel input
DPS 3	Finger-type pressure bar in the stacking compartment in the cash output	Stacker input
DPS 4	Switching dispensing/transport	Stacker wheel input
DPS 8 / DPS 9	Comb-type lifting bar sensor in the stacking compartment: in home position / cash output	Above reject box
EEP	Cassette connector with EEprom	
PS 1	Banknote counter; controls single reject deflector (reflective photosensor)	
PS 18	Note or notes in the stacking compartment	
PS 19	Banknote counter, control stacker wheel	
PS 21	Monitoring of cash path in the reject cassette	Above reject box
PS 22	Path monitoring of cash output and bundle reject	
PS 26	Notes in cash-out position, presenting position	Output transport
PS 33	Cash path monitoring photosensor in the output transport	

Component	Designation	Location
PS 35	Cash path monitoring photosensor in the output transport	
MA 2	Lift magnet for single reject deflector	Single reject
SW 1	Reject/retract box pushed in	Reject box
SW 2	Safety switch stacker cover	Cover plate in front of the bundle reject deflector
SW 3	second function key	at the control panel on the chassis
SW 4	Safety switch	Cassette rack
SM 5	Stepper motor for comb-type lifting bar drive in the stacking compartment	Stacker wheel input
SM 6	Stepper motor for bundle reject switch	Above reject box
SM 7	Stepper motor (indoor)	Shutter
SM 9	Stacker wheel stepper motor	Stacker wheel input

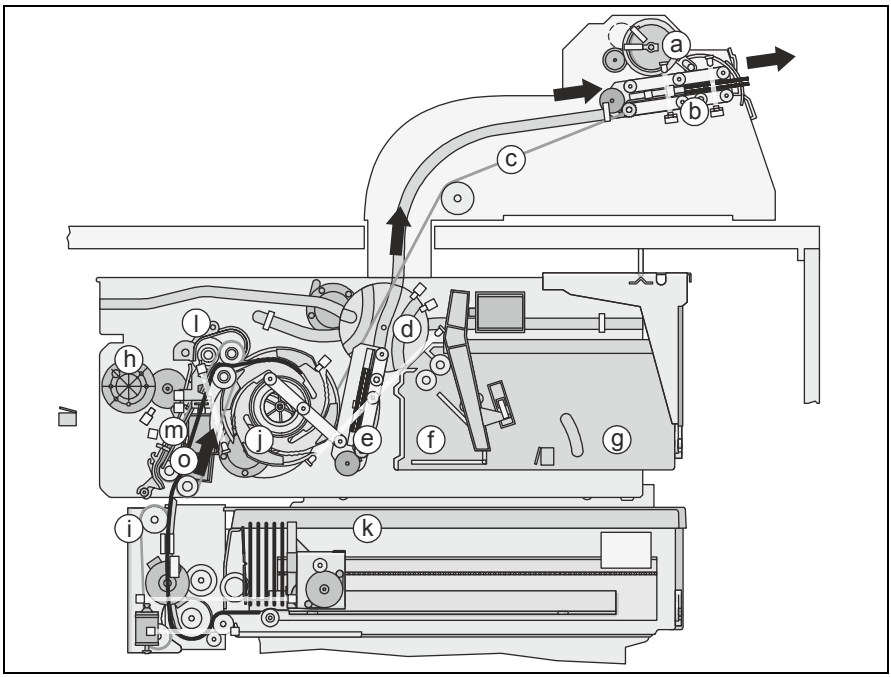
Processes in the CMD-V4 (schematic)

In the following, the most important processes in the CMD-V4 are shown step-by-step and described. To do so, the shown schematic drawing of the CMD-V4 with vertical transport (Frontload) is used.



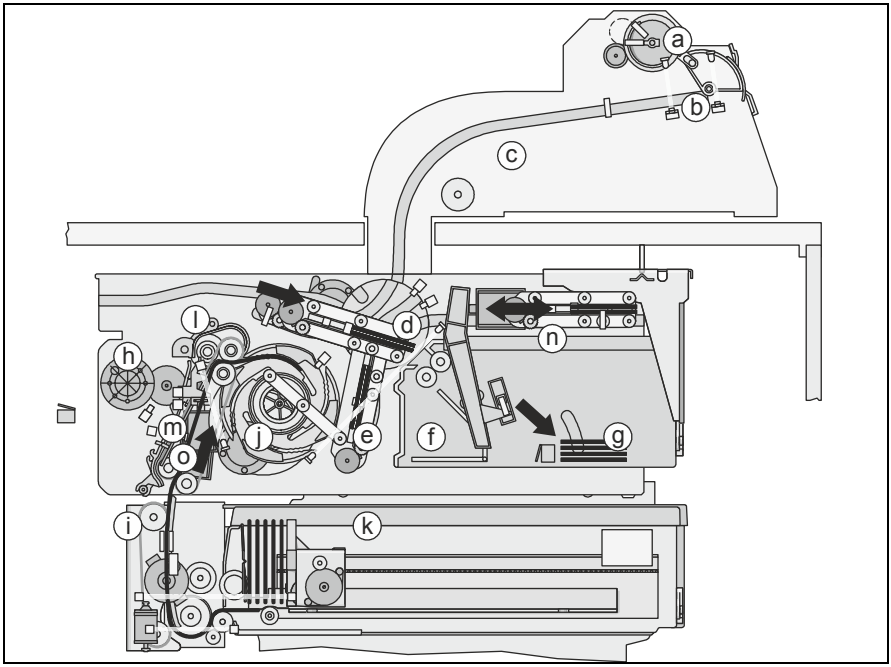
A Shutter
b Clamp in cash-out position
c Output transport vertical FL
d Routing disk
e Clamp in stacking position
f Retract box of the reject/ retract cassette
g Reject box of the reject/ retract cassette
h Main drive motor
i Multiple-note detection unit
j Stacker wheel
k Cassette 1
l Single reject switch
m Single reject box
n Dispensing direction (horizontal LF)
o Serial number recognition scanning rail

Dispensing in the direction of the customer



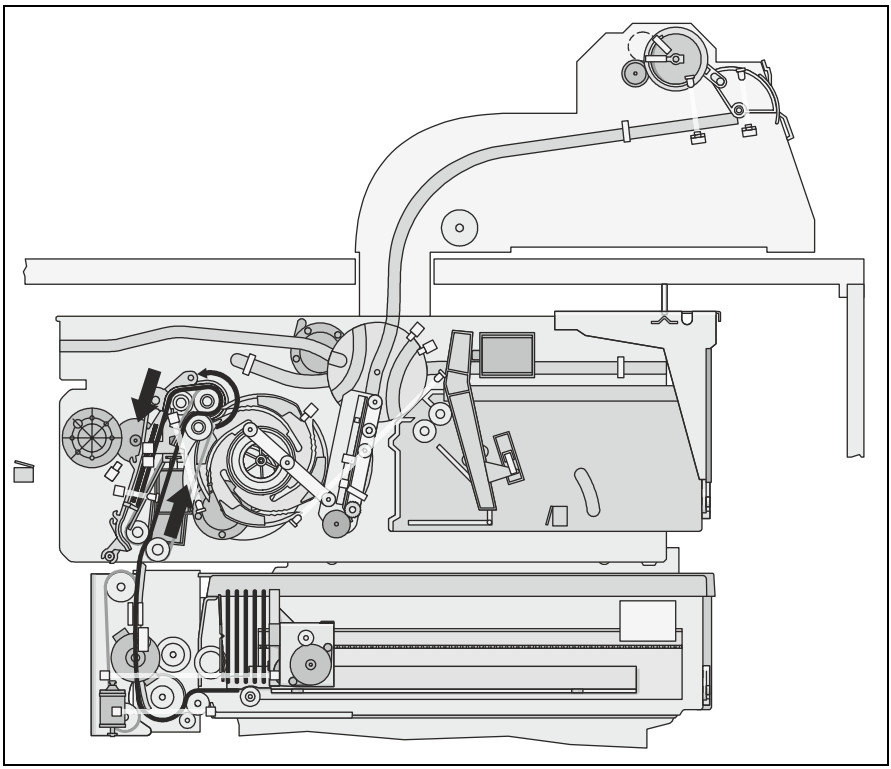
1. Dispensing of the requested banknote number one after another from every cassette (overall max. 60) (k)
2. Transport of the single notes to the multiple-note detection unit (i)
3. Transport of single notes for serial number detection (configuration-dependent) (o)
4. All 'good notes' are stored in the stacking position of the clamp (e)
5. Clamp gets closed with the routing disk
6. Routing disk takes the vertical dispensing position (d)
7. Transport of the bundle to the cash-out position (b)
8. The shutter opens
9. Transport of the bundle to the removal position
10. Note output by the customer
11. The shutter closes
12. Clamp goes back to its stacking position and switches automatically open (e)

Bundle reject

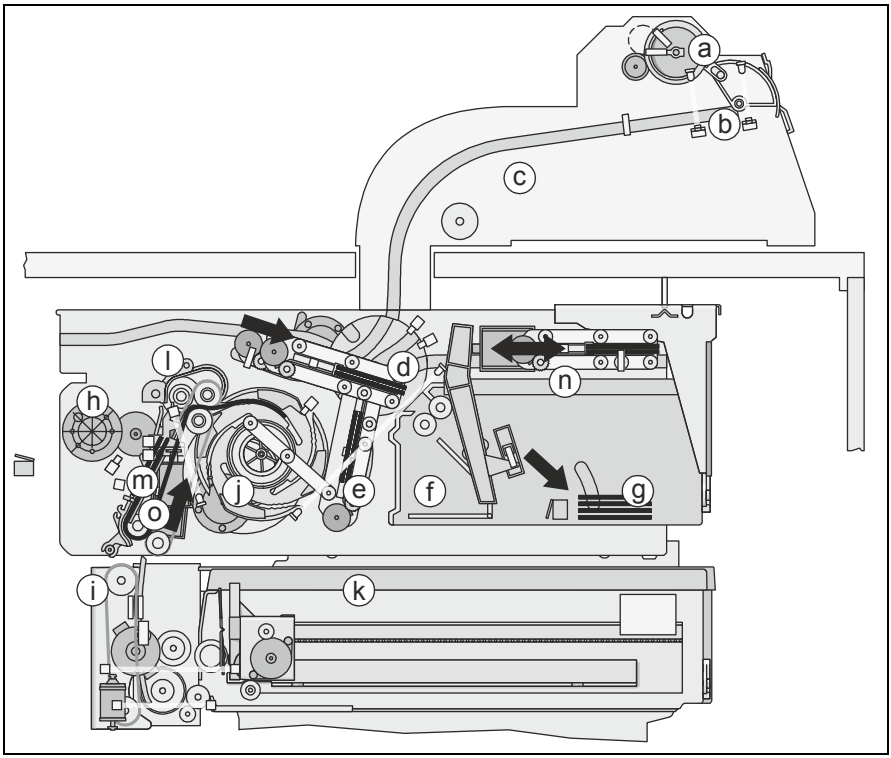


1. - 4. Process as the dispensing in the direction of the customer (vertical Frontload)
5. Routing disk takes the horizontal dispensing position Frontload (d)
6. Clamp moves in the direction of the dispensing (horizontal Frontload) (n)
7. Routing disk moves to the reject/retract position (d)
8. Clamps moves in the reject/retract position
9. Routing disk moves to the reject/retract position "Block the route" (d)
10. Clamps moves in the reject/retract cassette as far as possible
11. Routing disks turns in the reject/retract position and moves the clamp to its reject/retract position by that
12. Transport of the bundle in the reject box of the reject/retract cassette (g)

Single reject



1. - 3. Process as the dispensing in the direction of the customer (vertical Frontload)
   3.1 If a 'bad note' gets recognized, it is controlled with the single reject switch (i) and stored in the single reject box (m). Max. two 'bad notes' per transaction can be stored in the single reject box. They don't have to be from one transaction.
4. - 11. Process as the dispensing in the direction of the customer (vertical Frontload)



12. Bad notes are stored from the single reject box (m) via the stacker wheel (j) in the stacking position if the clamp (e).
13. Routing disk takes the horizontal dispensing position Frontload (d)
14. Clamp moves in the direction of the dispensing (horizontal Frontload) (n)
15. Routing disk moves to the reject/retract position (d)
16. Clamps moves in the reject/retract position
17. Routing disk moves to the reject/retract position "Block the route" (d)
18. Clamps moves in the reject/retract cassette as far as possible
19. Routing disks turns in the reject/retract position and moves the clamp to its reject/retract position by that
20. Transport of the bundle in the reject box of the reject/retract cassette (g)

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