



Giesecke+Devrient

Service Manual

BPS® C5



Original operating instructions

Art.-No. 522501011
Issue 04/2021

Note

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Disclaimer

The specifications stated in this documentation do not represent guaranteed characteristics.

This documentation is based on the machine type BPS® C5, hardware release 3.6 and software release 4.2.

Subject to technical changes.



This product meets the safety requirements of the relevant EU directives and complies with the EN standards as listed in the EU Declaration of Conformity.



This product has been awarded the GS mark for "tested safety" by an independent test and certification body, after type-testing according to the German Product Safety Act (ProdSG, section 20 and section 21).

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Technical support	→ Chapter J "Technical Support", p. 305
Printed for	Giesecke+Devrient Currency Technology GmbH © 2021
Item number	522501011
Issue date	04/2021

Changes

Issue Overview

Version	Change
1	Serial production
2	New features / changes in hardware release 3.6 and software release 4.2: <ul style="list-style-type: none">● Configure Virtual PD● Full Software Installation● MoveM Calfilebuilder and MoVEm Function Check● Friction Elements in Singler● Banknote Restrictor● Stacker Cover● Stacker synchronisation● MTS Sensor● 3R 16 MM Guide Roller

- → *Section 3.8.1.2 “Removing the Top Cover”, p. 32*
New Chapter
- → *Section 3.8.1.9 “Removing U Cover”, p. 46*
New Chapter
- → *Section 4.2 “Software Tools”, p. 59*
New software tools MoveM Calfilebuilder and MoVEm Function Check added
- → *Section 5.2 “Replacing Parts in the Singler Module ”, p. 71*
The chapter has been revised for singler intermediate 2
- → *Section 5.2.3 “Replacing the Singler Drum Assembly”, p. 73*
The chapter has been revised for Singler (intermediate 2).
- → *Section 5.2.4 “Replacing the Hopper Wheels Assembly”, p. 75*
The chapter has been revised for Singler (intermediate 2).
- → *Section 5.2.5 “Replacing the Retarding Wheels Assembly”, p. 77*
The chapter has been revised for Singler (intermediate 2).
- → *Section 5.2.6 “Removing the Guide Roller Assembly (1R 16MM)”, p. 78*
The chapter has been revised for Singler (intermediate 2).
- → *Section 5.2.7 “Removing the Roller Assembly (3R 1G)”, p. 79*

The chapter has been revised for Singler (intermediate 2).

- → *Section 5.2.8 “Removing the Spur Gear (14T W6)”, p. 79*

The chapter has been revised for Singler (intermediate 2).

- → *Section 5.2.9 “Removing the Singler Motor”, p. 80*

The chapter has been revised for Singler (intermediate 2).

- → *Section 5.2.10 “Replacing the Friction Elements in the Singler ”, p. 81*

New Chapter

- → *Section 5.2.11 “Installing Banknote Restrictor ”, p. 85*

New Chapter

- → *Section 5.3 “Replacing Input Stacker Module Parts”, p. 88*

New Chapter

- → *Section 5.3.1 “Removing the Encoder Disk”, p. 88*

New Chapter

- → *Section 5.3.2 “Removing the Stepper Motor”, p. 91*

New chapter

- → *Section 5.3.3 “Removing the Stacker Wheel Assembly”, p. 92*

New Chapter

- → *Section 5.3.3.1 “Installing Stacker Cover ”, p. 98*

New Chapter

- → *Section 5.3.4 “Installing the Stacker Wheel Assembly”, p. 103*

New Chapter

- → *Section 5.3.5 “Removing the Input Module Stacker Controller Circuit Board ”, p. 105*

New Chapter

- → *Section 5.3.6 “Removing the Guide Roller Assembly (3R 16 MM)”, p. 106*

New Chapter

- → *Section 5.3.7 “Replacing Banknote Diverters in Input Module”, p. 110*

New Chapter

- → *Section 5.13.2 “Replacing the Processors ”, p. 141*

The chapter has been revised.

- → *Section 5.14 “Replacing the Fuses”, p. 144*

New Chapter

- → *Section 5.15 “Replacing the Cable Harness Connector Switch”, p. 145*

- → *Section 5.16 “Replacing the Cable Harness RLY-SDM PWR”, p. 151*

New Chapter

- → *Section 5.17 “Replacing the Cable Harness SDM-SDM PWR CP”, p. 153*

New Chapter

- → *Section 5.23 “Replacing SDM CPU Board”, p. 167*

New Chapter

- → *Section 6.4 “Stacker Synchronization”, p. 185*
New Chapter
- → *Section 6.4.1 “Aligning the Stacker Wheel and the Encoder ”, p. 186*
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- → *Section 6.4.2 “Stacker Motor Assembly Test”, p. 189*
New Chapter
- → *Section 6.5 “Adjusting the Solenoid Assembly”, p. 195*
New Chapter
- → *Section 7.5 “Viewing the Software Version Details”, p. 205*
The chapter has been revised.
- → *Section 7.11 “Switching On/Off the Authenticity Features”, p. 216*
New Chapter
- → *Section 7.14 “Updating the Software Manually”, p. 236*
Updated Complete Software information
- → *Section 7.14.2 “Updating the Software Package”, p. 238*
Updated Complete Software information
- → *Section 7.14.3 “Installing Fresh CAB Software Update”, p. 241*
New Chapter
- → *Section 7.14.4 “Updating Software After PCB Main Board Replacement”, p. 244*
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- → *Section 7.14.5 “Updating Software After Sensor Processor Replacement”, p. 245*
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- → *Section 7.14.6 “Updating Software After DP Processor Replacement”, p. 249*
New Chapter
- → *Section 7.20 “Backup and Restore Using SD Card”, p. 257*
Update for software release 4.0.1
- → *Section 7.20.1 “Generating a Backup on the SD Card”, p. 259*
Update for software release 4.0.1
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Update for software release 4.0.1
- → *Section 7.21 “Performing Touch Calibration for the replaced Display”, p. 261*
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- → *Section 7.22 “Configuring the Virtual Photo Detectors”, p. 263*
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- → *Section 8.1 “Maintenance Plan”, p. 265*
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- → *Section 8.1.1 “Daily Maintenance Plan”, p. 266*
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- → *Section 8.1.2 “Weekly Maintenance Plan”, p. 266*
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- → *Section 8.1.4 “Half-Yearly Maintenance Plan”, p. 267*
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- → *Section 8.4 “Cleaning Instructions for Mechanical Thickness Sensor (MTS)”, p. 276*
New Chapter
- → *Chapter C “Input Module Error Codes Summary”, p. 285*
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- → *Chapter D “Standard Delivery Module Error Codes Summary”, p. 287*
New Chapter

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1 About This Manual

This chapter contains the following information:

- Overview of all manuals in the BPS C5 operating instructions
- Target group of this manual
- Content and structure of this manual
- A description of the conventions used in this manual

1.1 Overview of All Manuals for the BPS C5 System Operating Instructions

Site and Facility Requirements

This manual forms part of the System Operating Instructions. The following manuals form part of the System Operating Instructions:

The Site and Facility Requirements contain the technical data for the product and describe the conditions that must be met at the installation site for safe operation of the product.

Transport Instructions

The Transport Instructions are intended for employees of logistics companies. They contain outline information for secure transportation of the product to the installation location.

Quick Start Guide

These quick instructions are intended for all users of the product. They describe the first steps without using text so that the user can operate the product. The quick instructions are supplied with the product.

Safety Information

The safety information is intended for all users of the product. It describes all the necessary safety measures for hazard-free use of the product. The safety information is supplied with the product.

Installation Manual

The Installation Manual describes how to set up and connect the product.

User Manual

The user manual is intended for all users of the product and contains the following information about:

- Operating the product and straightforward cleaning and maintenance work that is not performed by Service
- Installing and using the software applications

Service Manual

The Service Manual describes maintenance work carried out on the product by field engineers.

The maintenance work includes:

- The replacement of parts for repairs (corrective measures) including the necessary adjustment work
- Installing and using the software application for Service

Troubleshooting Manual

You will only receive a service manual after you or your staff have received training from G+D to become a field engineer.

The Troubleshooting Manual offers an interactive troubleshooting including links to detailed procedures and video tutorials.

The Troubleshooting Manual is only available as part of the electronic documentation library EB Suite. The contents of the Troubleshooting Manual depend on your access rights.

Spare Parts Catalog

Please use the electronic spare parts catalog for Banknote Processing Systems on CD/DVD to order spare parts.

1.2 Target Group of this Manual

The manual is intended for the service technician.

1.3 Content and Structure of This Manual

This manual contains the following:

- The → "Safety" chapter contains important safety information.
- In the → "General Information about the Product BPS C5" chapter, you will find an overview of the product.
- The → "BPS C5 Site and Facility Requirements" chapter contains the technical data for the product and describes the requirements that must be met at the installation site to safely operate the product.
- The → "Installation" chapter contains information on the transport, installation, and commissioning of the product.
- The → "Operation" chapter contains the following information:
 - Important terms
 - Operating controls
 - Operating unit and user interface
 - Default settings
 - Banknote processing operating procedures
 - System settings
 - System faults
 - Cleaning
- The → "Disposal" chapter provides you with all the information required for disposal.
- The → *Appendix* contains useful additional information. Examples:

- Technical data
- Description of reports
- A description of the criteria for fitness sorting
- Symbols used
- Contact addresses
- A list of abbreviations and glossary of terms
- Table of figures
- Index

1.4 Conventions Used in this Manual

1.4.1 General Document Conventions

The following formatting styles are used as standard to identify certain information:

Conventions	Definition
<u>This text is important.</u>	Underlined text indicates important information.
Mechanical operating control	Names of mechanical operating controls like keys or switches are written in bold. Example: Press Start on the device.
GUI Text	Objects in the graphical user interface (GUI), e. g. a button, are in bold. Example: Click OK .
Menu option > Menu option	Menu names are in bold. Angle brackets indicate navigation through menus. Example: Select File > Print from the menu.
'User input'	User inputs are in single quotes. Example: Enter port = '8080' .
<Placeholder>	Placeholders for display text or user input are in angle brackets.

Conventions	Definition
	Example: Enter <Password>.
[Key]	Keys on the keyboard are in square brackets. Example: Press [Alt] + [p] to print the file.
<i>File or path</i>	File names or paths are in italics. Example: Open <i>readme.txt</i> .
Command	Commands are in Courier font. Example: Open an input window and enter <code>ping</code> .
Code	Codes are in courier font.
"Title"	Titles of reports, logs, modes, windows, etc. are in quotation marks. Example: The "xy" window appears.
→ " <i>Manual title</i> "	References to other manuals are in italics. The manual title is also in quotation marks. Example: → " <i>Service Manual</i> "
→ <i>Chapter "Chapter heading"</i>	References to other chapters/sections are in italics. The title of the chapter/section is also in quotation marks. For example, → " <i>Jam Recovery</i> " chapter
<i>Homepage Giesecke +Devrient</i>	References to a website address are in italics.
1. list entry 2. list entry	In numbered lists, make sure you follow the sequence of list entries.
• list entry • list entry	In unnumbered lists, the sequence of list entries is not important.

Conventions	Definition
a) list entry b) list entry	In alphabetical lists, the list entries give alternatives.
	This symbol identifies important information.
*	* indicates optional components. Inquire if the option is available on your machine.
[1]	Numbers in square brackets indicate individual operational steps. You must carry out these steps in the sequence indicated.
⇒	An arrow as shown after a step indicates the result of that step.

1.4.2 Document Conventions for Procedures (Instructions)

This section explains how procedures (instructions) are set out. Follow procedures step by step in the specified order.

Example Procedure

Requirements for the Procedure

- Requirement 1
- Requirement 2



DANGER

Safety information before the procedure

Applies to the whole procedure

Observe the measures to prevent risks at each step.

Procedure

- [1] Perform this step.



[2] Perform this step. Note the image above.

⇒ Result of this step



Figure 1: Image of a Result

Secondary Steps

[3] To perform this step:

[3-1] Perform this secondary step.

[3-2] Perform this secondary step.

Prompts to Skip or Repeat Steps

[4] Prompt, e.g. has the error been rectified?

No: → [5]

Yes: → [6]

[5] Only carry out this step if you answered the above prompt with No.

Continue with: → [7]

[6] Only carry out this step if you answered the above prompt with Yes.

Continue with: → [7]

[7] Perform this step.

Alternative Steps

[8] Select the appropriate alternative:

For variant A: → [8a]

For variant B: → [8b]

[8a] Variant A

[8a-1] Perform this step for variant A.

[8a-2] Perform this step for variant A.

[8b] **Variant B**

[8b-1] Perform this step for variant B.

Result

⇒ Result of the procedure

1.4.3 Figures Used

The screenshots used are examples and may differ from what is actually shown on the display.

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2 Safety

Before you work with our product, you must have previously read and understood the system operating instructions and especially the safety instructions they contain. You may only then operate and maintain our product if you are trained and authorized to do so. Remain conscious of safety as you work.

2

This chapter contains the following information:

- Overview of the general symbols for safety information
- Overview of the symbols identifying specific hazards
- Safety instructions for BPS C5

2.1 Safety Information Symbols



DANGER

The symbol together with the signal word **DANGER** indicates an immediate danger to life or health.

Ignoring this warning results in death or serious injury.

The safety information tells you about the type and source of the danger, the consequences if it is not observed, and the measures to take to prevent the danger.



WARNING

The symbol together with the signal word **WARNING** indicates a possible danger to life or health.

Ignoring this warning may result in death or serious injury.

The safety information tells you about the type and source of the danger, the consequences if it is not observed, and the measures to take to prevent the danger.



CAUTION

The symbol together with the signal word **CAUTION** indicates a possible danger to health.

Ignoring this warning may result in minor injury.

The safety information tells you about the type and source of the danger, the consequences if it is not observed, and the measures to take to prevent the danger.

**NOTICE**

This symbol, with the signal word **NOTICE**, is used to identify warning information.

Ignoring this information may result in damage to parts of the product or jeopardize data consistency.

The safety information tells you about the type and source of the risk, the consequences if it is not observed, and the measures to take to prevent the risk.

2.2 Symbols Used to Identify Specific Hazards

Safety information with symbols for specific dangers tells you about the type and source for the risk, the consequences if it is not observed, and the measures to take to prevent the risk.



Risk of crushing

This symbol indicates a danger from crushing by moving parts.



Risk of electric shock

This symbol indicates a danger of electric shock.



Risk of laser radiation

This symbol indicates a danger from laser radiation.



Risk of LED radiation

This symbol indicates a danger from LED radiation.



Risk of burns

This symbol indicates a danger from burns from hot parts.



Risk of tripping

This symbol indicates a risk of tripping.

2.3 Safety Information

2.3.1 Proper Use

Our product has been constructed using the latest technology and is safe for operation. For your safety, you must use it appropriately and properly.

You must comply with the necessary safety measures for hazard-free use of the product. Failure to follow these instructions can put lives at risk or can damage the product.

Always take notice of the safety warnings, even if you are an experienced user with good system knowledge.

Proper Use

A banknote processing system may only be used to check banknotes for denomination, authenticity, and condition, to count and to sort them.

Fast Deposit Processing (FDPFD) is permitted.

The processing of header cards is permitted.

The processing of tickets is permitted.

Improper Use

Improper use, for example, the singling of hard objects such as coins, paper clips and staples, is not permitted and will result in the invalidation of the warranty.

2.3.2 Prohibition of Unauthorized Modifications or Changes

For safety reasons, no changes may be made to the product without informing and receiving written approval from the manufacturer.

Any unauthorized structural changes or additions invalidate the EU Declaration of Conformity for the product.

Any unauthorized structural changes or additions invalidate the GS mark approval for the product.

Only genuine spare parts may be used for repair.

2.3.3 Circumstances Under Which the Product May Not Be Operated

The product may not be operated if the ambient and operating conditions listed in the → "BPS C5 Site and Facility Requirements" section of the system operating instructions are not fulfilled.

If the product is not in an operational state for technical or other reasons, you must prevent the product from being started up.

2.3.4 Safety Information to Protect Persons

Be sure to comply with national accident prevention regulations.

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When working on the product, respect the following:

- Avoid wearing loose-fitting or open clothing.
- Remove ties, rings, watches, and jewelry before beginning work.
- Protect long hair with a scarf or hair net.

Refrain from any working method that may impair the operational safety of the product. Proceed in accordance with the safety information specified in the system operating instructions.

Ensure that unauthorized persons are kept away from the product.

Check the product for any externally identifiable damage and defects. Immediately report any safety-related changes (including in the operating behavior) to the internal department responsible.

Only operate the product when it is in perfect working condition.

Do not remove any safety devices. Do not disable any safety devices. This can put lives at risk or cause damage to the product.

Once service work is complete, you must check the safety devices. Log this check.

2.3.5 Safety Information on LED Radiation

This section contains safety information on optional components or external equipment containing LED radiation sources.

These components or devices are classified under IEC 62471 as LED devices.



WARNING

LED radiation

Danger of damage to the eyes

The ban on unauthorized alterations or changes applies universally to the mechanical, optical, and electronic parts of these components.

Improper usage can be hazardous due to dangerous LED radiation.

Opening the product does not increase the LED risk group or the risk to the operator.

2.3.6 Safety Information on Laser Radiation

This section contains safety information on optional components or external equipment containing laser radiation sources.

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These components or devices are classified as laser products under DIN EN 60825-1, Safety of Laser Products.



WARNING

Laser radiation

Danger of damage to the eyes

The following section contains information on whether the product is equipped with components that are a source of laser radiation. If it is, it is necessary to observe the respective safety information in this section.

The ban on unauthorized alterations or changes applies universally to the mechanical, optical, and electronic parts of these components.

Improper usage can be hazardous due to dangerous invisible laser radiation.

Opening the product does not increase the laser risk group or the risk to the operator.

2.3.6.1 Barcode Reader



CAUTION

Laser radiation

The use of controls, settings, or procedures other than the described here may result in hazardous laser radiation.

Customers should never attempt to perform maintenance on the laser scanner themselves.

Never look into the laser beam, even if you think that the scanner is not active.

Never open the scanner to look inside the device. If you do this, you may expose yourself to a dangerous laser beam.

The use of optical devices with this laser equipment increases the risk of visual impairment.

2.3.7 Safety Information for Software

The product has been designed to state-of-the-art software technology standards and is safe to operate. Failure to use the software correctly does not pose a hazard to the user.

Some basic knowledge of the software is required to use the product. Take care to consider the effects of changing or resetting parameters.

Incorrect use by insufficiently trained persons can lead to data loss and errors.

2.3.8 Safety Information for Handling Non-Rechargeable Batteries

Risk of fire, explosion, or leakage of harmful substances if non-rechargeable batteries are not handled correctly.

- Do not recharge, force open, heat, or burn the batteries.
- Make sure that the polarity is correct.
- Only replace batteries with the same type of battery.
- Dispose of used batteries according to the manufacturer's instructions.

2.3.9 Instructions for Disposing of Batteries

Do not throw old batteries should in the trash.

Dispose of old batteries in accordance with the applicable national (local) laws.

Make an active contribution to environmental protection. Return your old batteries to authorized collection points free of charge.

Batteries containing harmful substances are provided with the following symbol:



Figure 2: Symbol for Batteries Containing Hazardous Substances

The symbol includes the chemical name of the hazardous substance, for example, Cd for cadmium, Pb for lead, and Hg for mercury.

2.3.10 Information on Special Dangers for the Operator

During operation of the product, observe the following information:

Electrical Voltage/Current

Work on live parts and assemblies carries the risk of electric shocks. Only carry out this work if you are authorized to do so.

Ergonomics

Stand or sit in a comfortable manner. Arrange your workstation so that you can work ergonomically.

- Set your chair to the optimum position.
- Correct the height of the work surface if possible.
- Tilt the touch screen to the optimum position if possible.

Non-Specified Materials

Dangers may arise from the use of non-specified materials such as cleaning material, sprays, lubricants, etc. If you use these materials, follow the manufacturer's safety instructions.

High Temperatures

Do not touch any parts that have warnings in the system operating instructions alerting you to high temperatures. These can cause severe burns.

Risk of Crushing

- When closing flaps, doors, transport sections, etc., be careful that your hands or fingers are not crushed between the closing edges. Use the operating equipment provided.
- When starting the singler, make sure that your hand is not in the singler area.

Dust

Never use compressed air to clean the product. Breathing in dust can lead to health problems. Dust in the air can also damage the bearings and electronic parts. No claims can be made under the warranty for parts that are damaged in this way. Always vacuum up any dust with a suitable vacuum device, fitted with a micro-filter.

2.3.11 Additional Safety Information for the Field Engineer

The maintenance and repair tasks are described in the service documentation of the system operating instructions.

Securing the Product Environment

If you are required to operate the product in an opened condition, ensure that no persons are in the immediate vicinity of the product. Prevent access to moving or current-carrying parts under all circumstances. If necessary, put up warning signs and/or barriers.

Safety Measures While Working on the Product

Extreme care should be taken when carrying out any adjustments or measurements that require the product to be switched on.

Safety Devices

If disabling or removing safety devices is necessary for maintenance and repair work, then you must fit the safety devices immediately on completion of the maintenance and repair work. Only after this is done are you permitted to release the product for operation.

Notes on Working with the System Switched On

Certain tasks must be performed with the product switched on. Be aware of the increased risks involved. You must be authorized to undertake this work.

Working on Current-Carrying Units

If you are required to perform work on current-carrying units, you may only undertake this work under stringent compliance with the national safety guidelines. The prescribed tools must be used.

Danger from Hot Parts

During operation, parts may become very hot.

Take extreme care when removing or working on these units. You find warnings on the risk of burns in the system operating instructions.

Information on Working on a Product in Operation

There are some tasks that you have to perform while the product is in operation. Be aware of the increased risks involved. You must be authorized to undertake this work. The instructions for working on the machine when it is switched on are applicable. In addition, the following instructions apply.

Service Mode

If you operate the product in service mode, some of the safety devices are deactivated. Deactivating the safety devices enables you to carry out tests and measurements.

When the service work is complete, you are only permitted to switch the product from service mode back to normal mode and hand it back to the operator with the paneling closed.

Motion Sequence Testing

If you are testing motion sequences (for example, as part of preventive maintenance), you must ensure that no-one is in the immediate vicinity of the product.

Carelessness can lead to injuries in tests requiring manual intervention. Restrict such interventions to what is absolutely necessary.

3 BPS C5 Assembly Overview

The BPS C5 consists of the following modules.

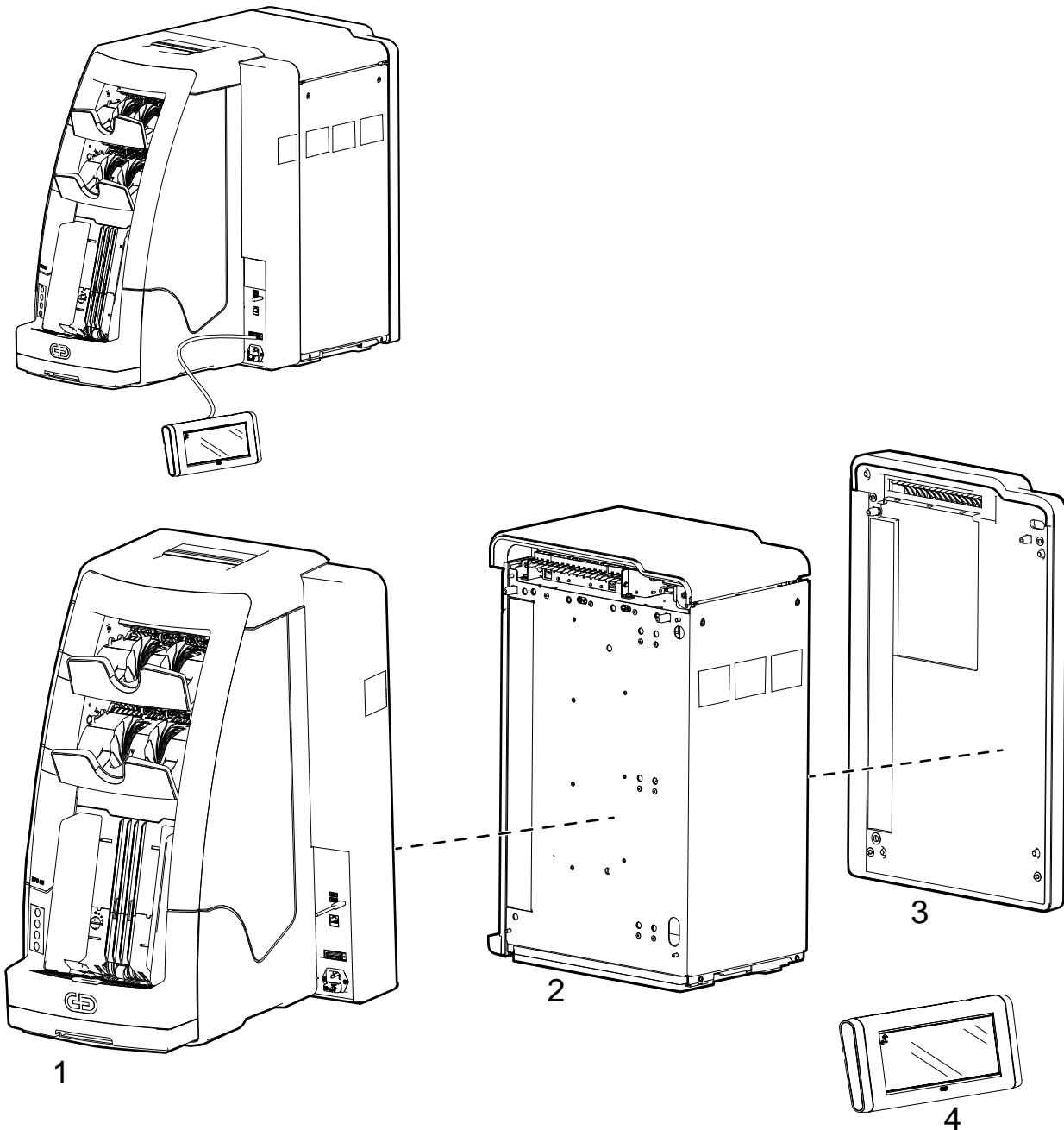


Figure 3: Assembly Overview

- 1 Input Module - IM (Input Base Module (IBM) + Input Coupling Module (ICM))
- 2 Standard Delivery Module - SDM
- 3 Fail-safe Module - FS
- 4 Display Module

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3.1 Input Module Overview

The Input Module (IM) consists of the following modules

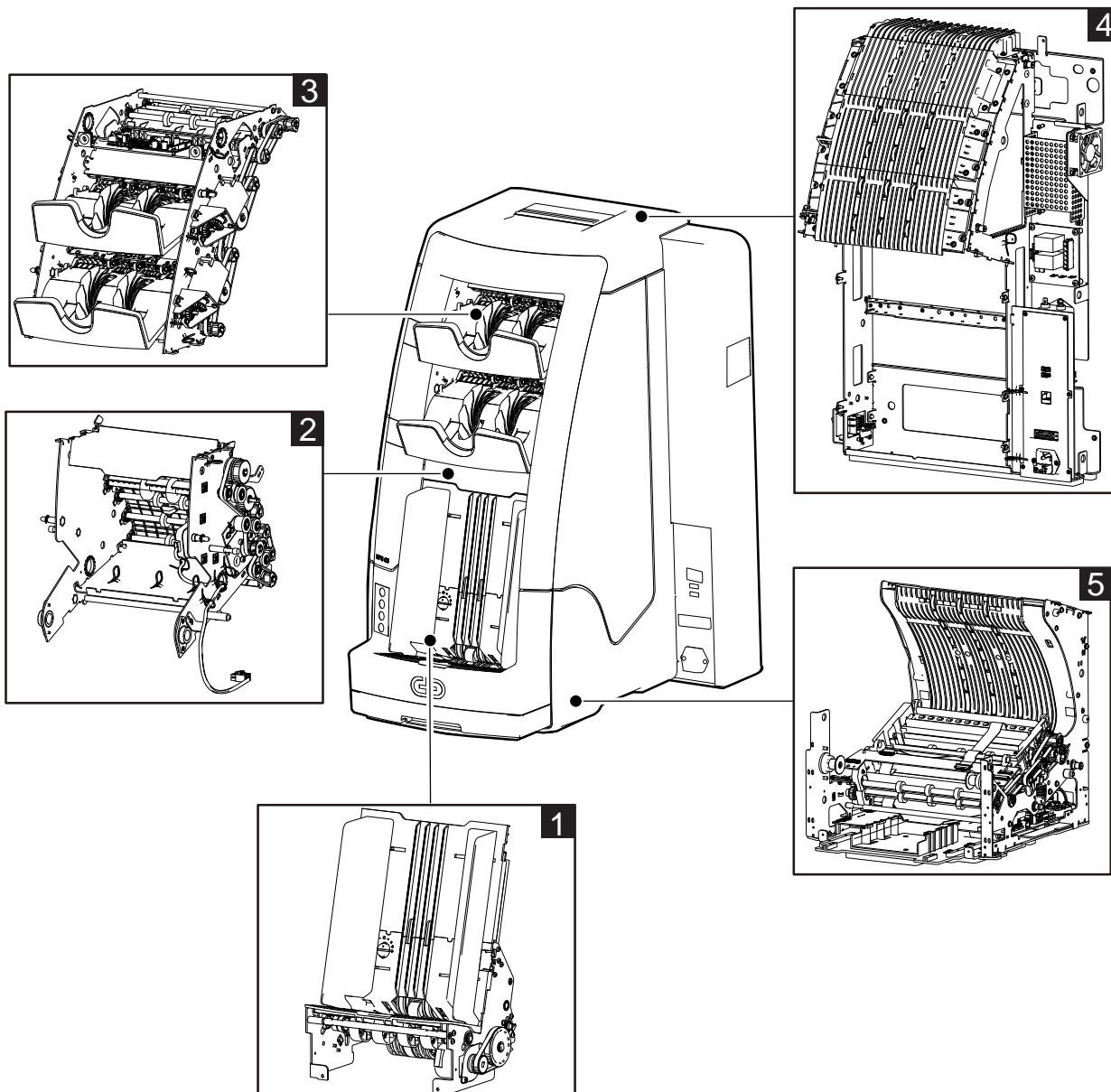


Figure 4: Input Module Overview

- 1 Singler
- 2 Front Panel Module
- 3 Front Transport Module
- 4 Base Transport Module
- 5 Base Module

3.2 Standard Delivery Module Overview

The Standard Delivery Module (SDM) consists of the following modules.

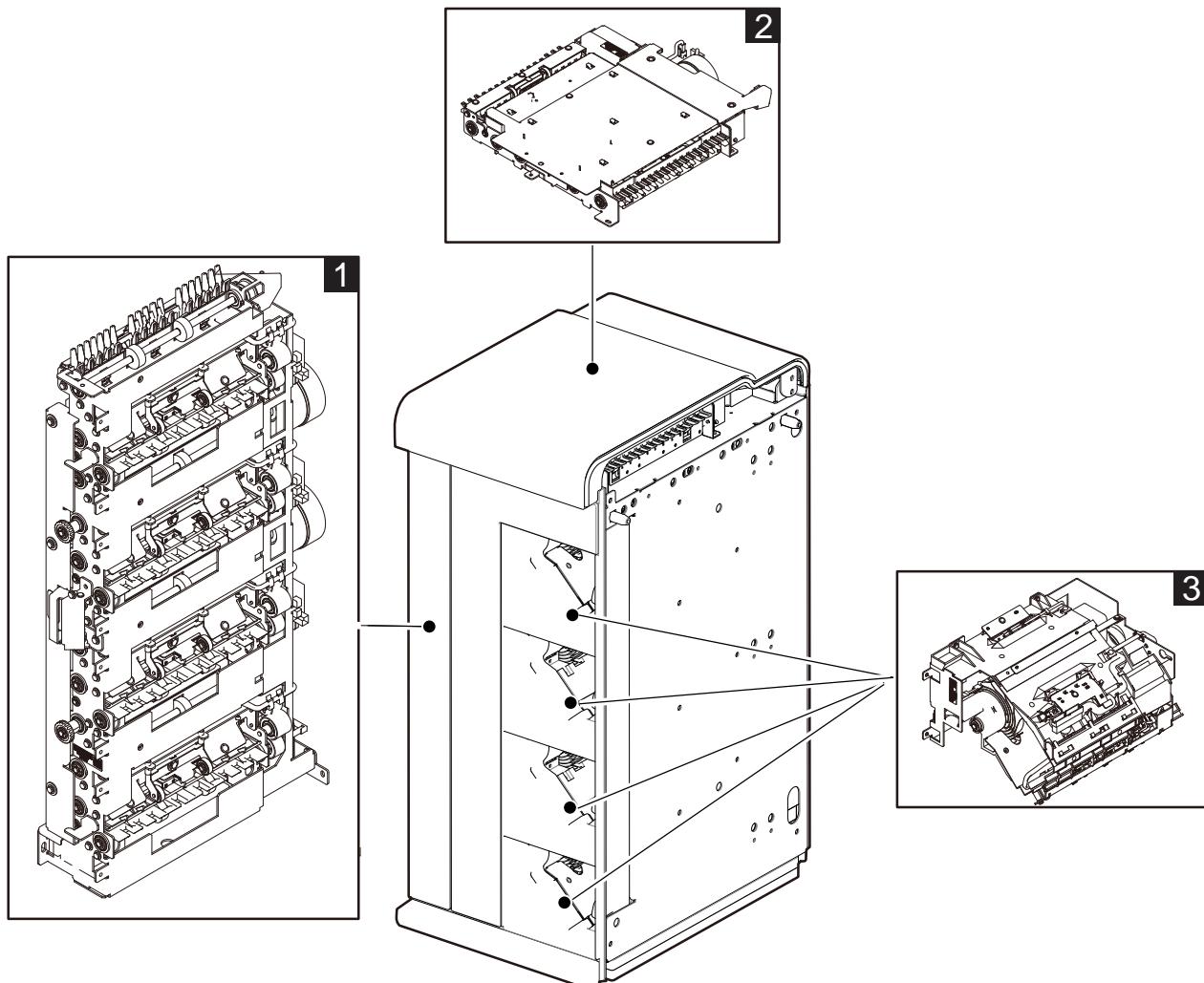


Figure 5: Standard Delivery Module Overview

- 1 Vertical Transport Module
- 2 Horizontal Transport Module
- 3 Stacker Unit (4 x)

3.3 Type Label

The BPS C5 has the following type label:



Figure 6: Type Label

You will find the type label on the rear of the machine.

3.4 Sensors Overview

The BPS C5 has a sensor unit, divided into two halves.

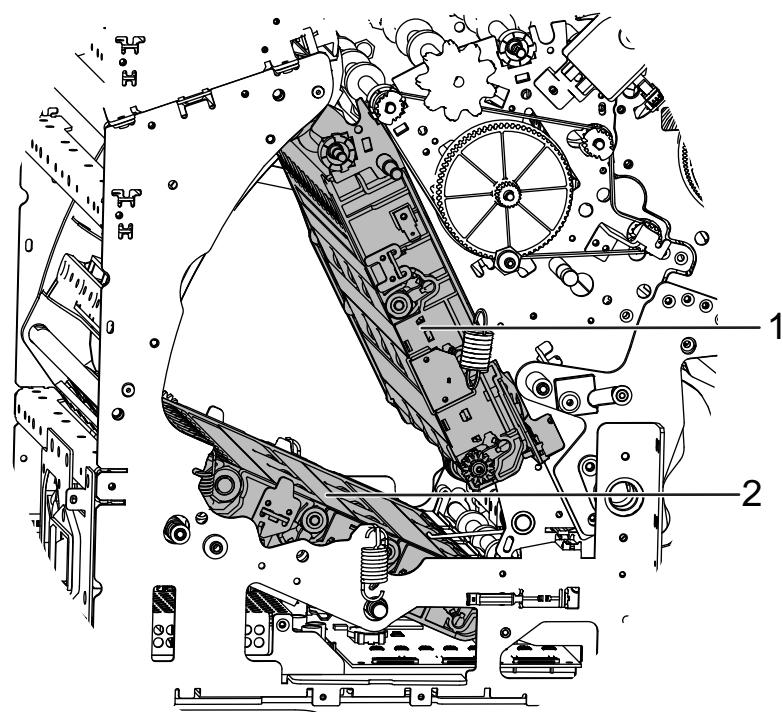


Figure 7: Sensor Housings Overview

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1. Upper Sensor Housing: Located in the front panel module.
2. Lower Sensor Housing: Located in the base transport module.

3.4.1 Upper Housing Sensors

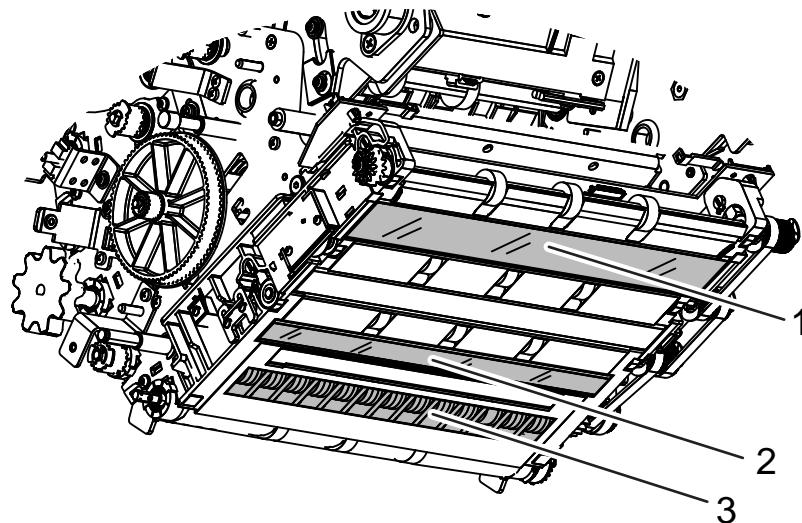


Figure 8: Upper Housing Sensors

- 1 PIS 2 (Primary Image Sensor) - Detects the banknote image, format, holes, tears, stains, soiled banknotes, dog ear, SNR
- 2 MAG (Magnetic) sensor - Detects the magnetic and security properties of the banknote
- 3 MTS (Mechanical Thickness Sensor) - Detects the banknote thickness (counterpart of MTS roller assembly, which is located in the lower sensor housing)

3.4.2 Lower Housing Sensors

3

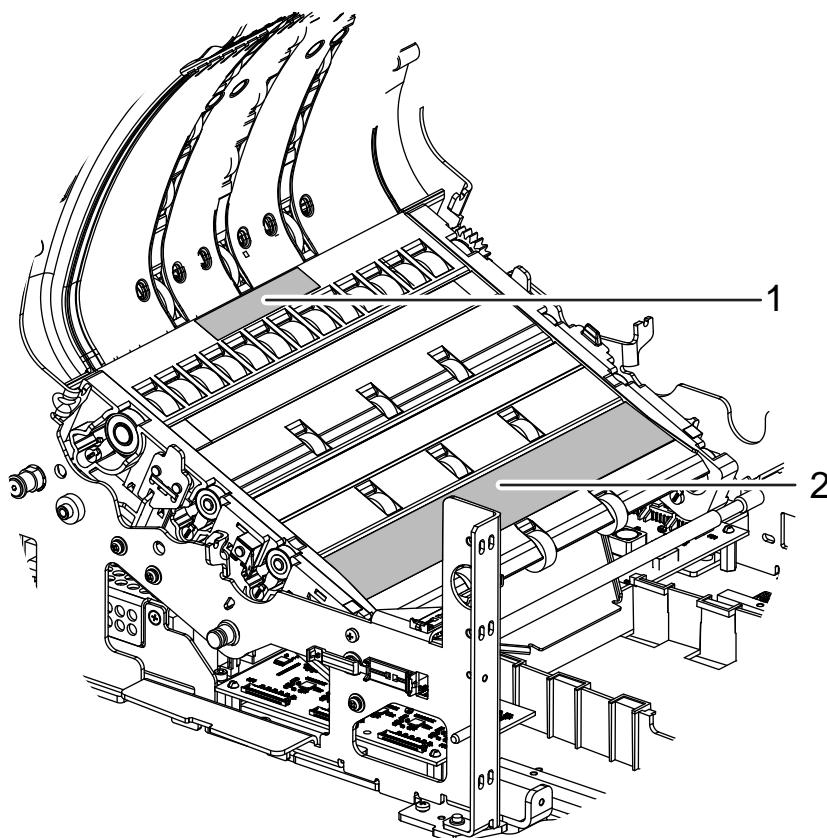
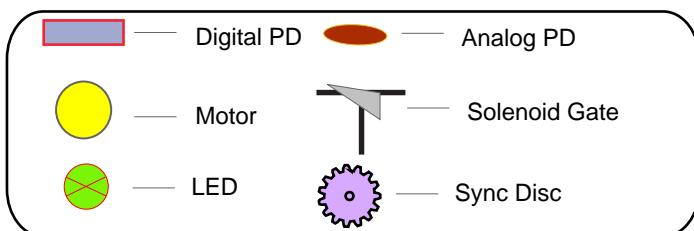
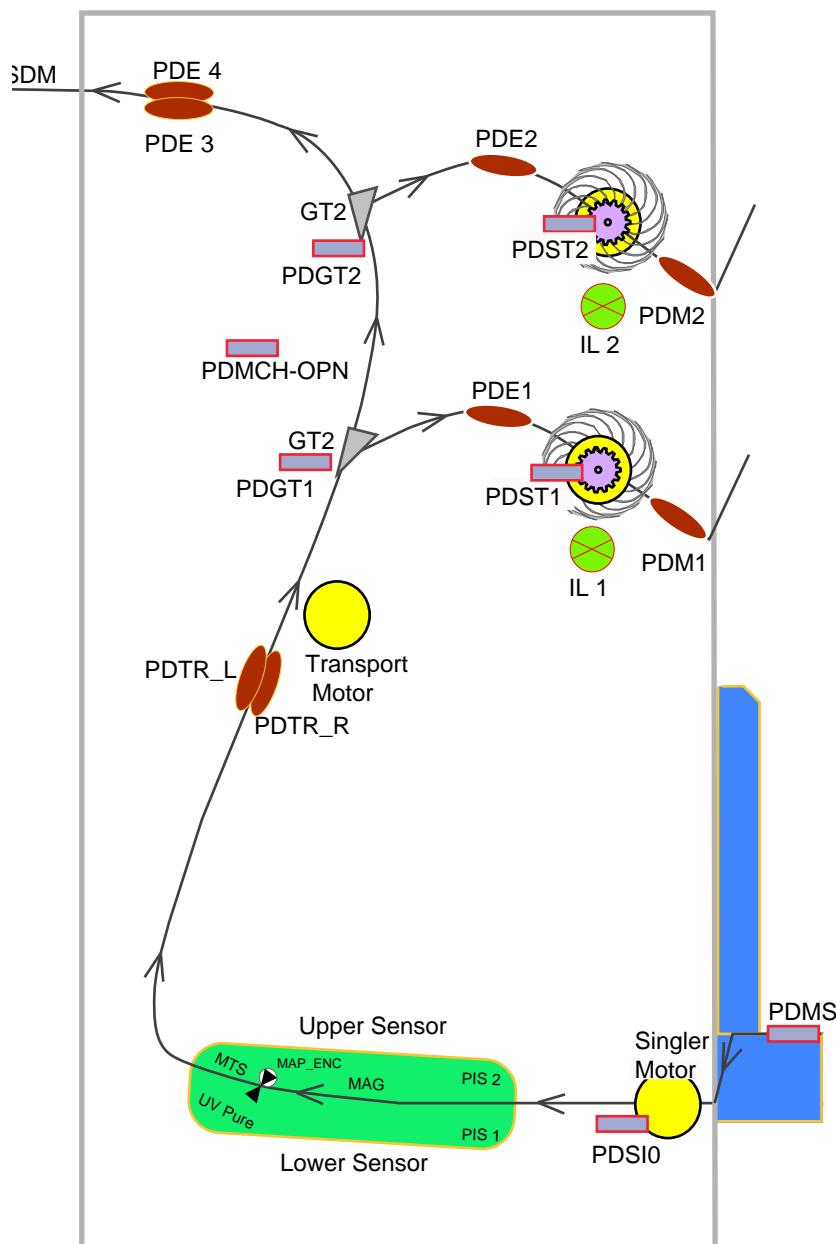


Figure 9: Lower Housing Sensors

- 1 UV (Ultra violet) sensor - Detects the ultraviolet properties
- 2 PIS 1 (Primary image sensor) - Detects the banknote image, format, holes, tears, stains, soiled banknotes, SNR. PIS 1 and PIS 2 functions as one unit.

3.5 Banknote Transport Path



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Figure 10: Banknote Transport Path (Input Module)

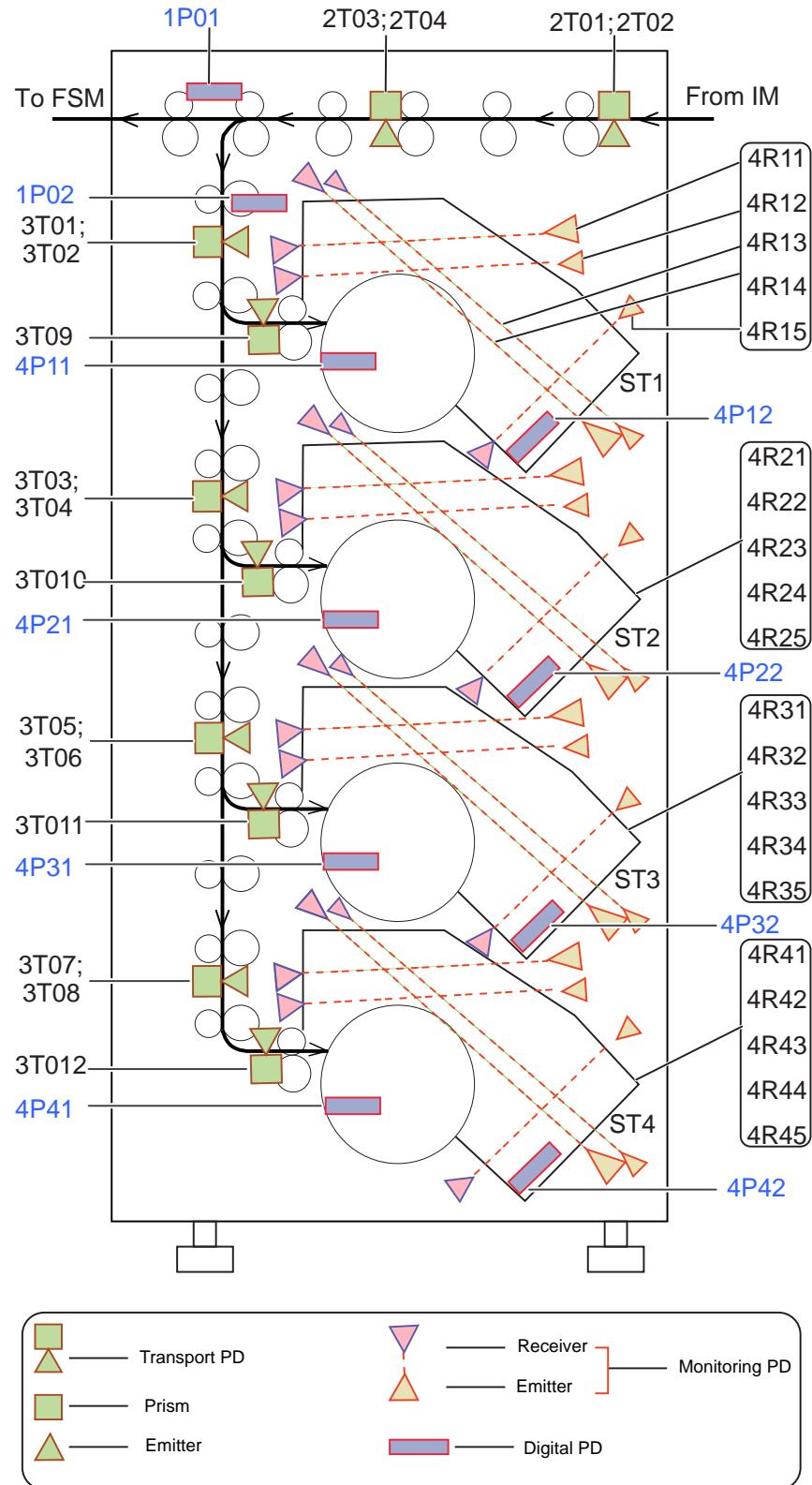


Figure 11: Banknote Transport Path (Standard Delivery Module)

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3.6 Photo Detectors Overview

You will find BPS C5 (IM and SDM) photo detectors layout in the banknote transport path.

→ *Section 3.5 “Banknote Transport Path”, p. 23*

3.6.1 Input Module Photo Detectors

Item No	Technical Name	Description	Functionality
1	PDMS	Photo detector monitoring singler	To check the presence of banknote on singler.
2	PDSI0	Photo detector home position	To check the singler home position and drum rotations.
3	PDTR_L;PDTR_R	Photo detector transport - left Photo detector transport - right	To check the banknotes transportation in transport path.
4	PDGT1	Photo detector gate solenoid 1	To check the open/close status of solenoid 1 diverter.
5	PDE1	Photo detector exit - stacker 1/reject stacker	To check the banknote transport into stacker 1/reject stacker.
6	PDST1	Photo detector sync disc - stacker1	To check the position of encoder/indexer of stacker 1
7	PDM1	Photo detector monitoring - stacker 1	To check the presence of banknote in stacker 1/reject stacker.
8	PDGT2	Photo detector gate solenoid 2	To check the open/close status of solenoid 2 diverter.

Item No	Technical Name	Description	Functionality
9	PDE2	Photo detector exit - stacker 2	To check the banknote transport into stacker 2
10	PDST2	Photo detector sync disc - stacker2	To check the position of encoder/indexer of stacker 2
11	PDM2	Photo detector monitoring - stacker 2	To check the presence of banknote in stacker 2
12	PDE 3; PDE 4	Photo detector exit - IM (left, right)	To check the banknotes transport from IM to SDM
13	PDMCH_OPN	Photo detector IM Open/Close	To check the open/close status of IM.

3.6.2 Standard Delivery Module - Photo Detectors

The Standard Delivery Module (SDM) consists of analogue and digital photo detectors.

→ *Section 3.5 “Banknote Transport Path”, p. 23*

SL. No	Technical Name	Functionality	Location
1	2T01; 2T02;2T03; 2T04	To check the banknotes transportation in Horizontal transport.	H - transport module
2	3T01; 3T02;3T03; 3T04 ;3T05; 3T06;3T07; 3T08	To check the banknotes transportation in Vertical transport.	V - transport module
3	3T09	To check the banknotes transportation into stacker 1.	SDM Stacker 1

SL. No	Technical Name	Functionality	Location
4	3T010	To check the banknotes transportation into stacker 2.	SDM Stacker 2
5	3T011	To check the banknotes transportation into stacker 3.	SDM Stacker 3
6	3T012	To check the banknotes transportation into stacker 4.	SDM Stacker 4
7	4R11;4R12;4R13;4R14;4R15	To check the presence of banknote in the stacker 1.	SDM Stacker 1
8	4R21;4R22;4R23;4R24;4R25	To check the presence of banknote in the stacker 2.	SDM Stacker 2
9	4R31;4R32;4R33;4R34;4R35	To check the presence of banknote in the stacker 3.	SDM Stacker 3
10	4R41;4R42;4R43;4R44;4R45	To check the presence of banknote in the stacker 4.	SDM Stacker 4
11	1P01	To check the gate solenoid open/close in H - transport	H - transport module
12	1P02	To check the gate solenoid open/close in V - transport	V - transport module
13	4P11	To check the home position of stacker 1 wheel.	SDM Stacker 1
14	4P12	To check the home position of stacker 1 banknote pusher.	SDM Stacker 1
15	4P21	To check the home position of stacker 2 wheel.	SDM Stacker 2

SL. No	Technical Name	Functionality	Location
16	1P22	To check the home position of stacker 2 banknote pusher.	SDM Stacker 2
17	4P31	To check the home position of stacker 3 wheel.	SDM Stacker 3
18	4P32	To check the home position of stacker 3 banknote pusher.	SDM Stacker 3
19	4P41	To check the home position of stacker 4 wheel.	SDM Stacker 4
20	4P42	To check the home position of stacker 4 banknote pusher.	SDM Stacker 4

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3.7 Standard Delivery Module - Electrical and Electronic layout

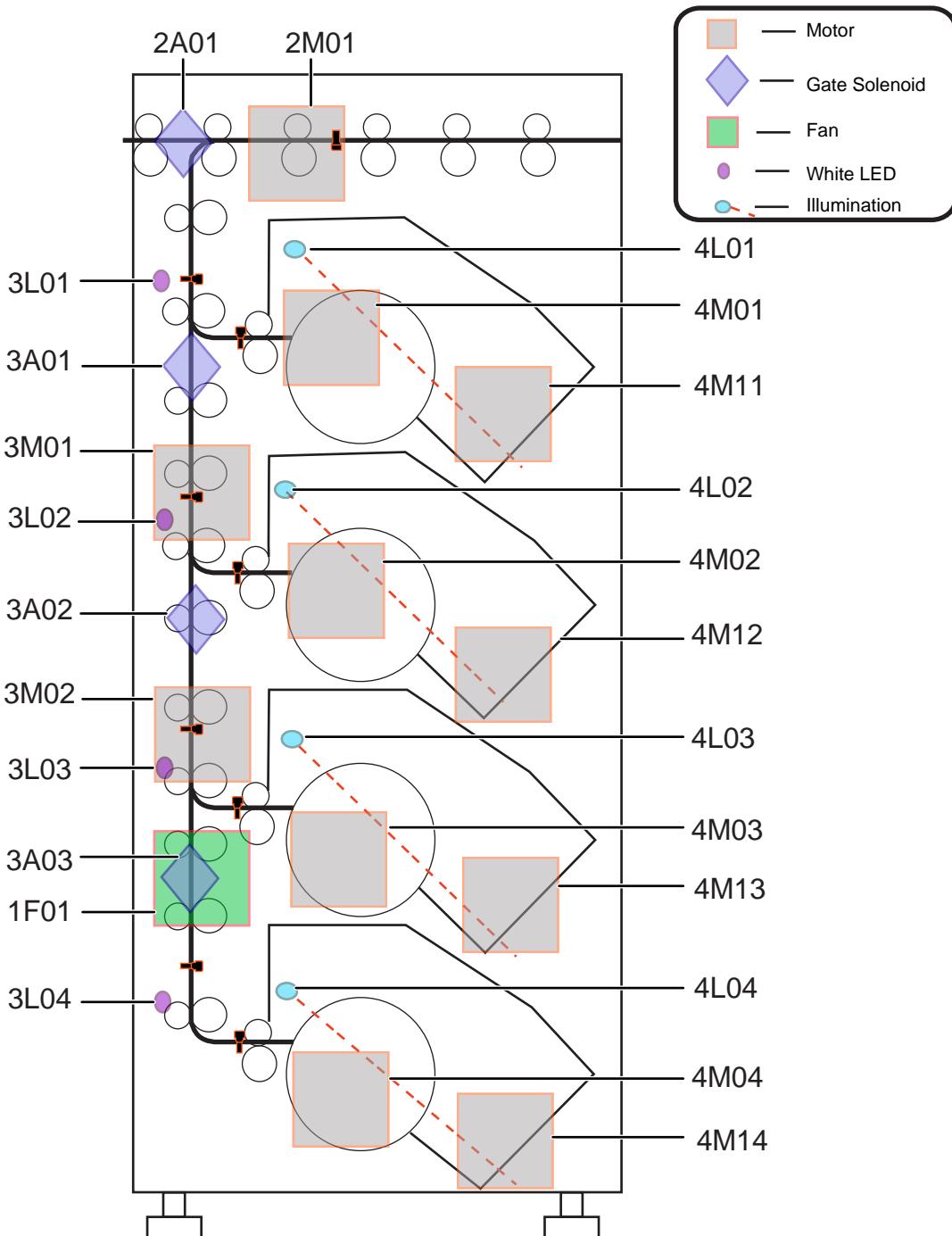


Figure 12: Standard Delivery Module Electrical and Electronic layout

3.8 BPS C5 Covers Overview

The BPS C5 consists of the following covers.

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1. Input Module (IM) covers
2. Standard Delivery Module (SDM) covers
3. Fail-safe (FS) cover

3.8.1 Input Module Covers

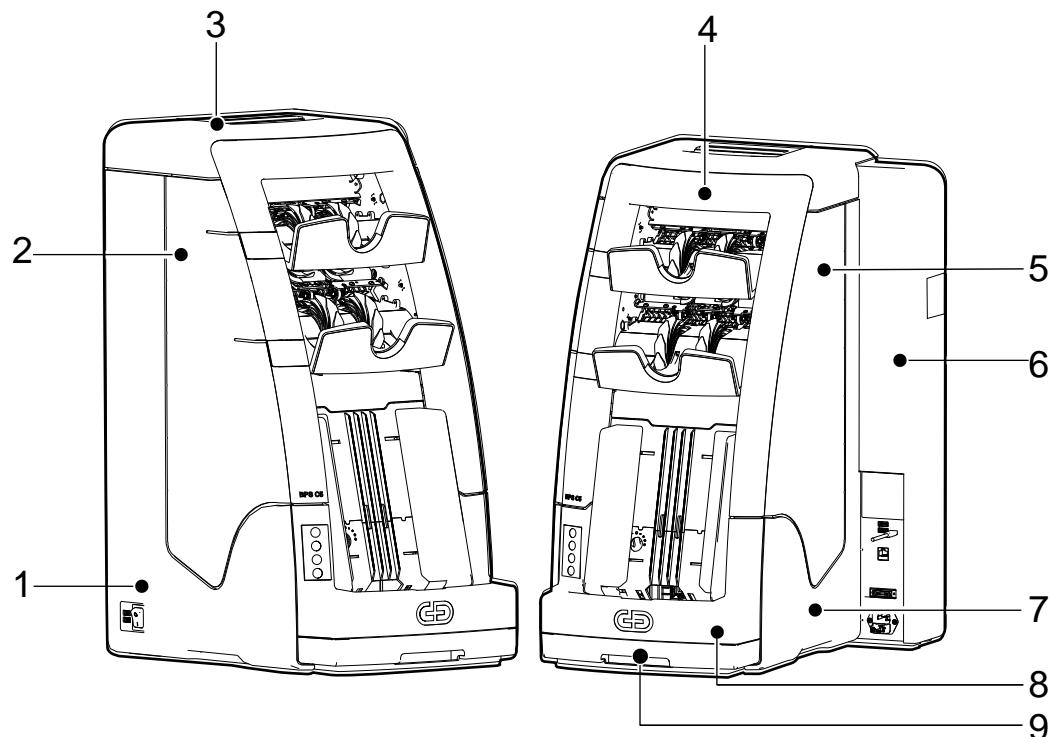


Figure 13: Input Module Covers

- 1 Front Base Cover
- 2 Front Cover
- 3 Top Cover
- 4 U Cover
- 5 Rear Cover
- 6 Power Supply Cover
- 7 Rear Base Cover
- 8 Singler Cover
- 9 Dust Tray

3.8.1.1 Removing the Dust Tray

The dust tray is at the front bottom of the input module.

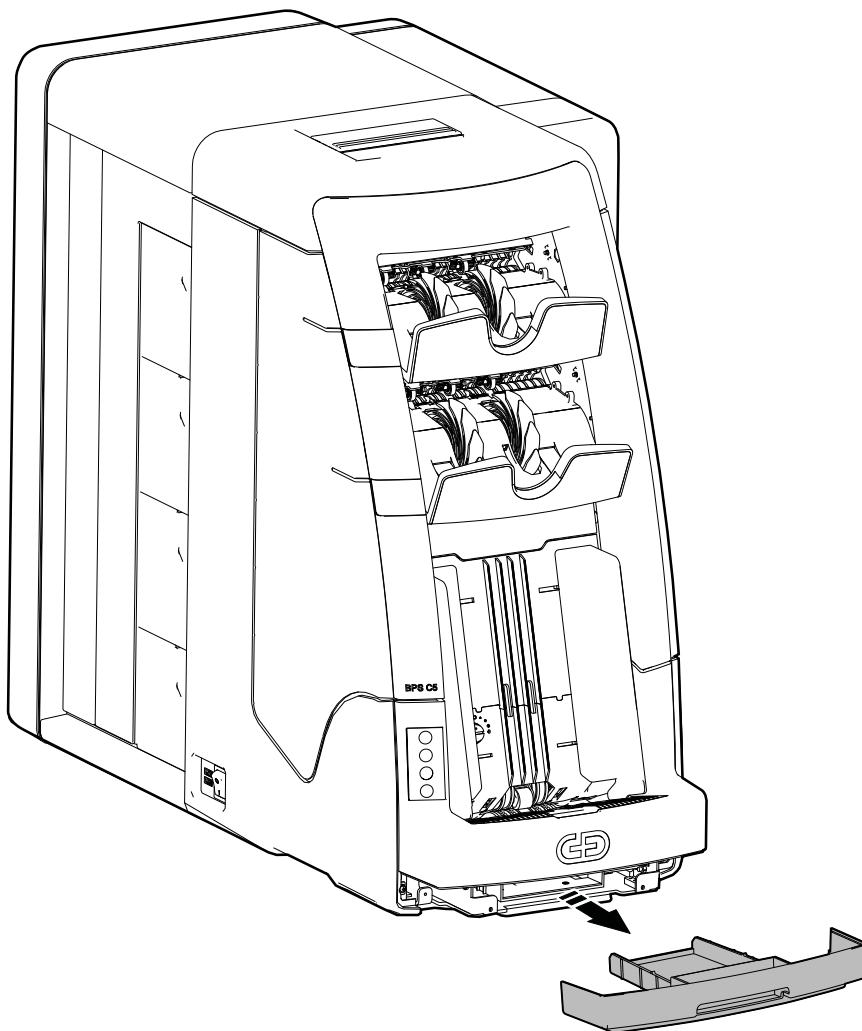


Figure 14: Dust Tray Removal

Procedure

- [1] Pull and remove the dust tray.

Result

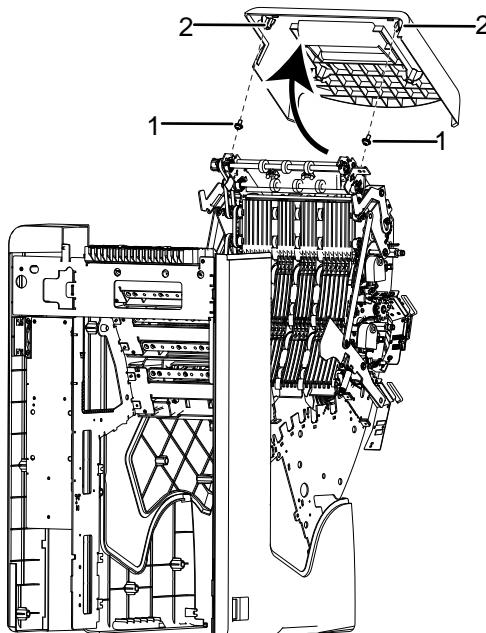
- ⇒ The dust tray is removed.

3.8.1.2 Removing the Top Cover

Requirements

- The BPS C5 is switched Off.
→ *Section 5.1.1 “Switching BPS C5 On and Off”, p. 63*
- Unplug the power plug from the power socket and secure the machine/device against being switched back on.
- The BPS C5 is opened.
→ *Section 5.1.2.1 “Opening Input Module (IM)”, p. 65*

Procedure



3

Figure 15: Top Cover Removal

- [1] Remove the screws (1) on both sides.
- [2] Pull and remove the cover as shown.
To remove, pull the cover starting from the snap side position (2) for easy removal.

3

**Important!**

There are rubber snap locks (2) for the cover fixing. Check and replace if any loose/damaged.

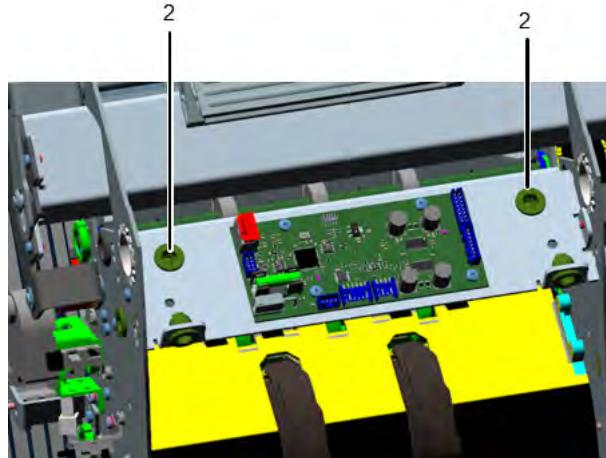


Figure 16: Snap Locks

While installing the cover, align the rubber snap locks properly and then press the cover.

Result

⇒ The top cover is removed.

3.8.1.3 Removing the Front Base Cover

Requirements

- The BPS C5 is switched Off.
→ *Section 5.1.1 “Switching BPS C5 On and Off”, p. 63*
- Unplug the power plug from the power socket and secure the machine/device against being switched back on.
- The BPS C5 is opened.
→ *Section 5.1.2.1 “Opening Input Module (IM)”, p. 65*
- The dust cover is removed.
→ *Section 3.8.1.1 “Removing the Dust Tray”, p. 31*

Procedure

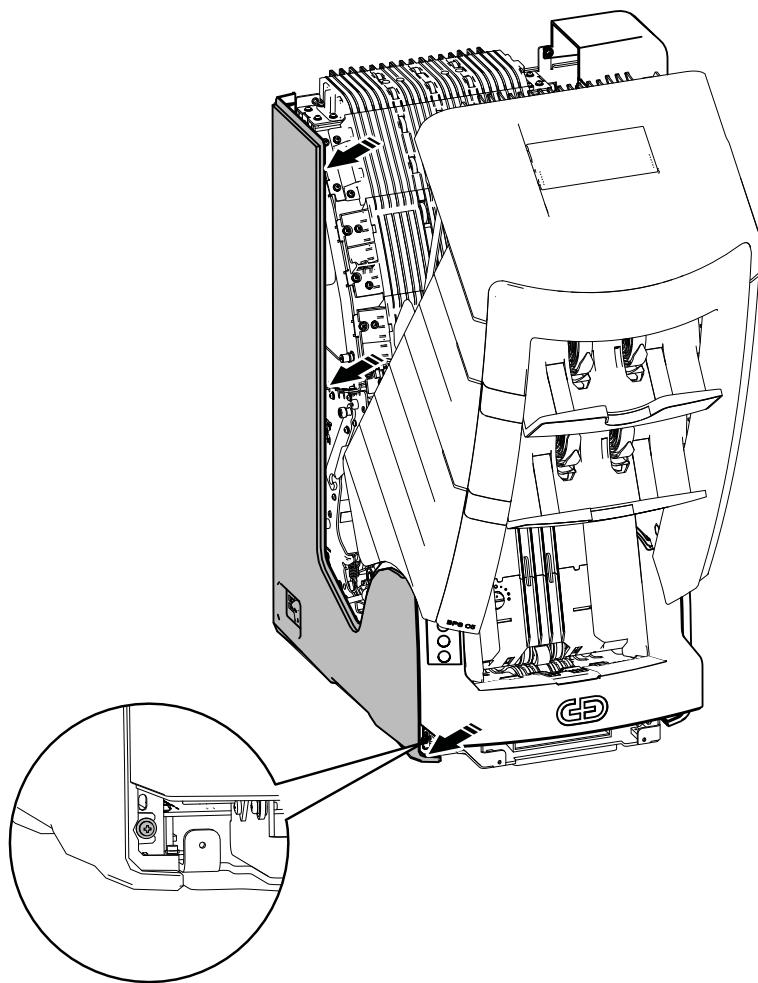


Figure 17: Front Base Cover Removal

- [1] Loosen the screw. Do not remove it completely.
- [2] Pull and remove the cover as shown.

**Important!**

There are rubber snap locks for the cover fixing. Check and replace if any loose/damaged.

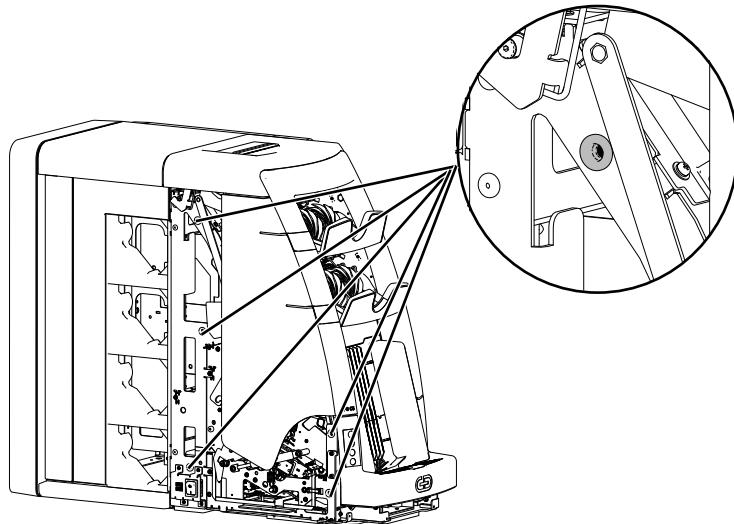


Figure 18: Snap Locks

Result

⇒ The front base cover is removed.

3.8.1.4 Removing the Front Cover

Requirements

- The BPS C5 is switched Off
→ *Section 5.1.1 “Switching BPS C5 On and Off”, p. 63*
- Unplug the power plug from the power socket and secure the machine/device against being switched back on.
- The BPS C5 is opened.
→ *Section 5.1.2 “Opening and Closing BPS C5”, p. 64*

Procedure

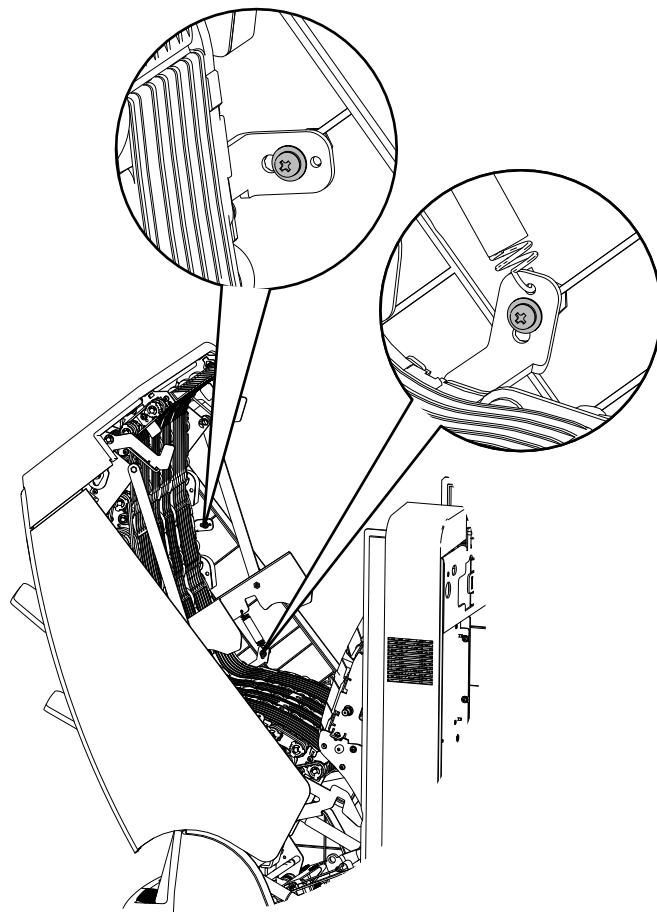
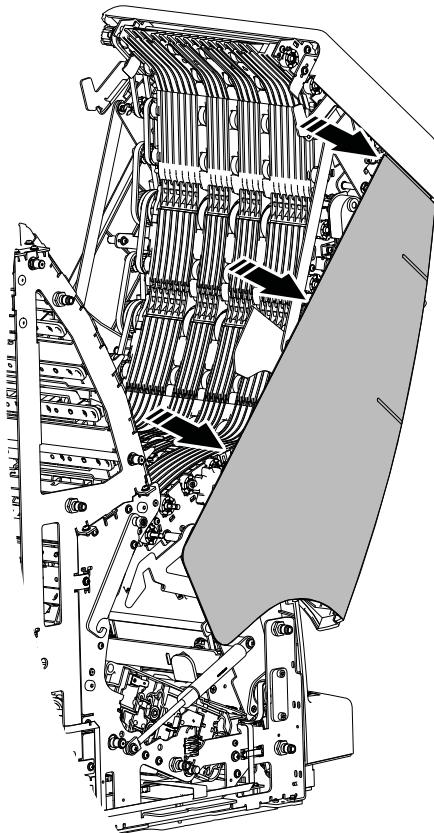


Figure 19: Front Cover Removal

- [1] Remove the screws from inside.

3



[2] Pull and remove the cover as shown.

Result

⇒ The IM front cover is removed.

**Important!**

There are rubber snap locks for the cover fixing. Check and replace if any loose/damaged.

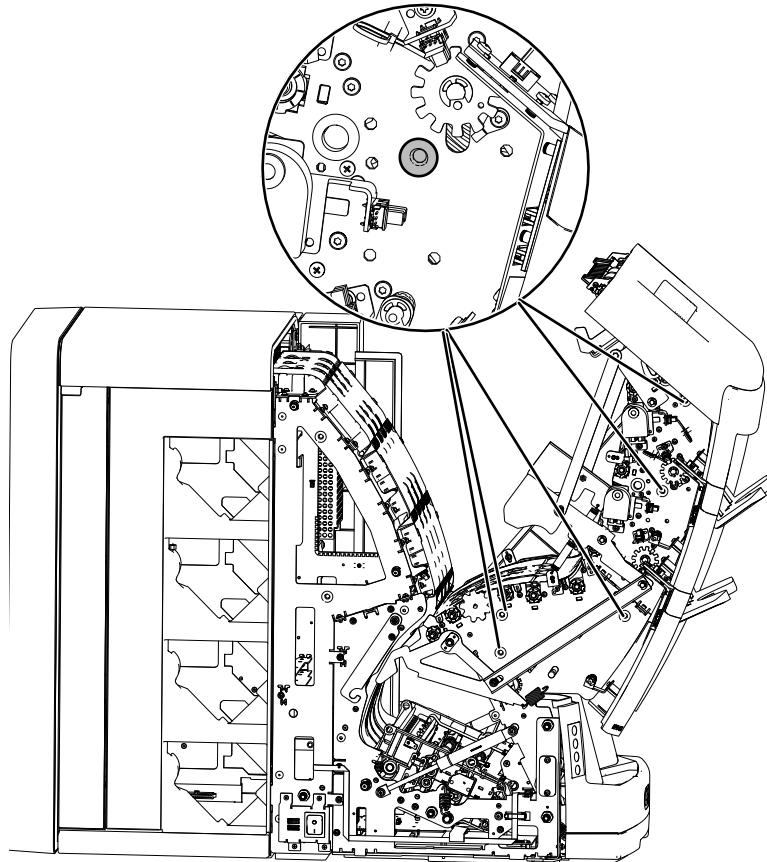


Figure 20: Front Cover Snap Locks

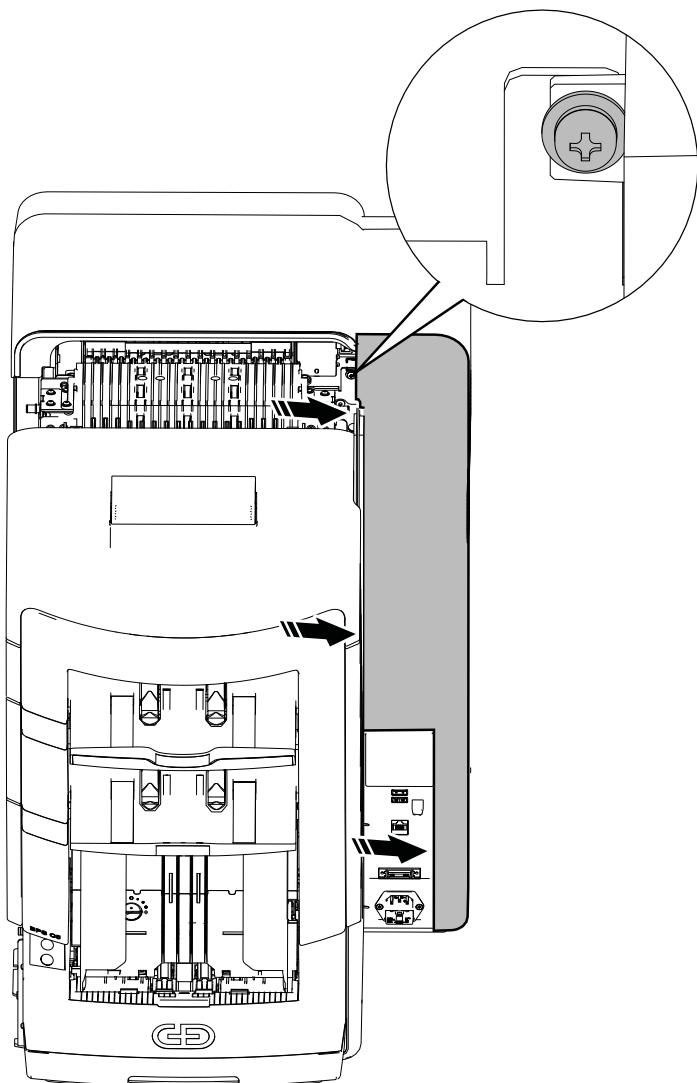
3.8.1.5 Removing the Power Supply Cover

Requirements

- The BPS C5 is switched Off.
→ *Section 5.1.1 “Switching BPS C5 On and Off”, p. 63*
- Unplug the power plug from the power socket and secure the machine/device against being switched back on.
- All the peripheral connectors are removed.
- The BPS C5 is opened.
→ *Section 5.1.2.1 “Opening Input Module (IM)”, p. 65*

Procedure

3

**Figure 21: Power Supply Cover Removal**

- [1] Loosen the screw.
- [2] Pull and remove the cover as shown.

Result

⇒ The power supply cover is removed.

**Important!**

There are rubber snap locks for cover fixing. Check and replace if any loose/damaged.

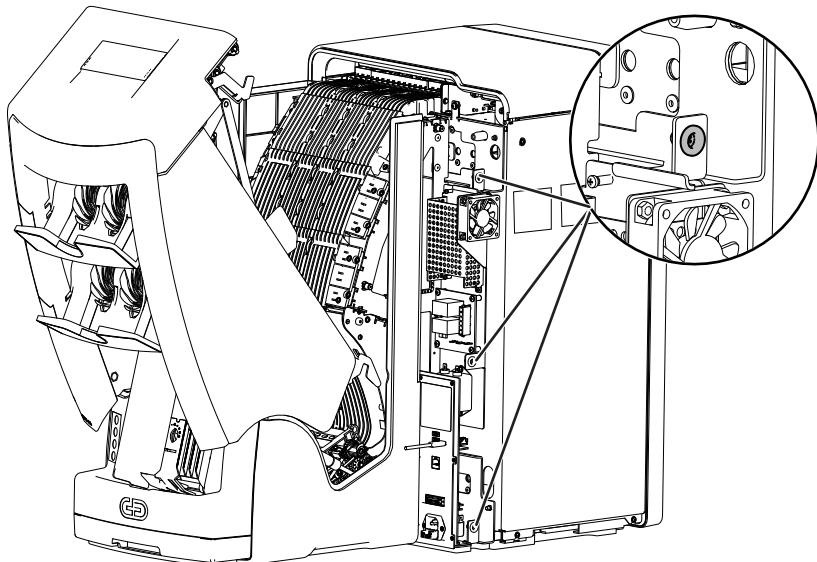


Figure 22: Power Supply Snap locks

3.8.1.6 Removing the Rear Base Cover

Requirements

- The BPS C5 is switched Off.
→ *Section 5.1.1 “Switching BPS C5 On and Off”, p. 63*
- The BPS C5 is opened.
→ *Section 5.1.2.1 “Opening Input Module (IM)”, p. 65*
- The dust tray is removed.
→ *Section 3.8.1.1 “Removing the Dust Tray”, p. 31*

Procedure

3

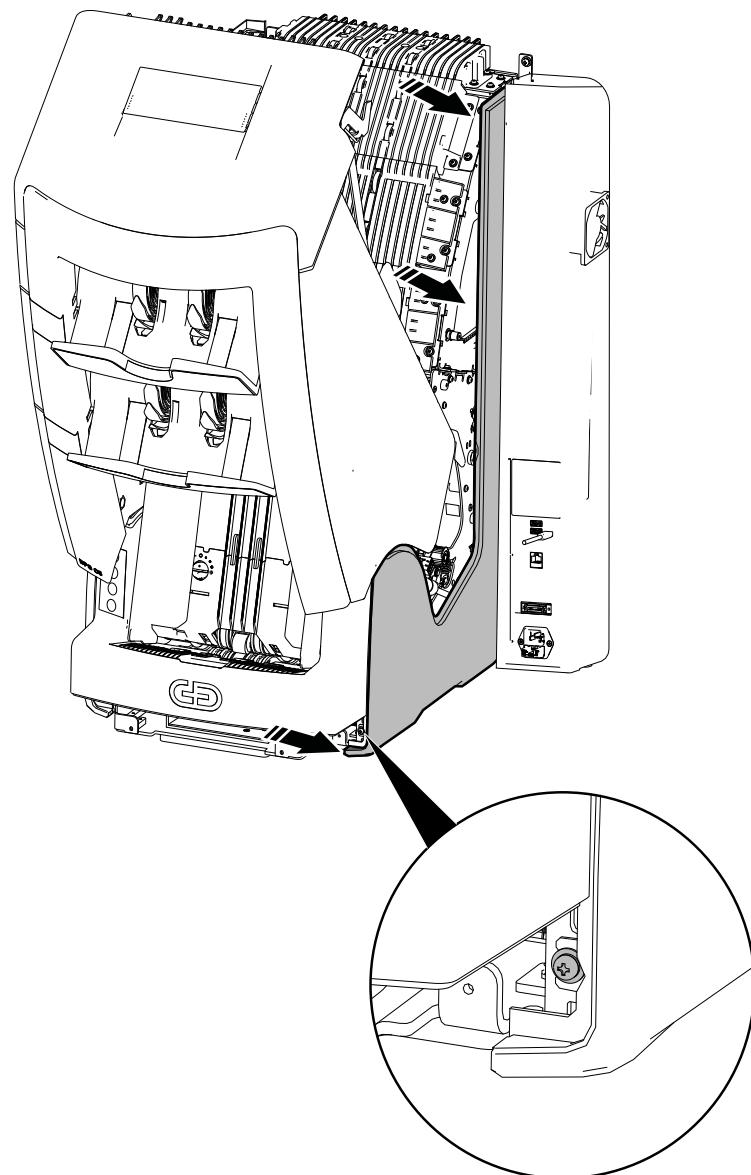


Figure 23: Rear Base Cover Removal

- [1] Loosen the screw. Do not remove it completely.
- [2] Pull and remove the cover as shown.

Result

⇒ The rear base cover is removed.

**Important!**

There are rubber snap locks for cover fixing. Check and replace if loose/damaged.

3.8.1.7 Removing the Rear Cover

Requirements

- The BPS C5 is switched Off
→ *Section 5.1.1 “Switching BPS C5 On and Off”, p. 63*
- Unplug the power plug from the power socket and secure the machine/device against being switched back on.
- The BPS C5 is opened.
→ *Section 5.1.2.1 “Opening Input Module (IM)”, p. 65*

Procedure

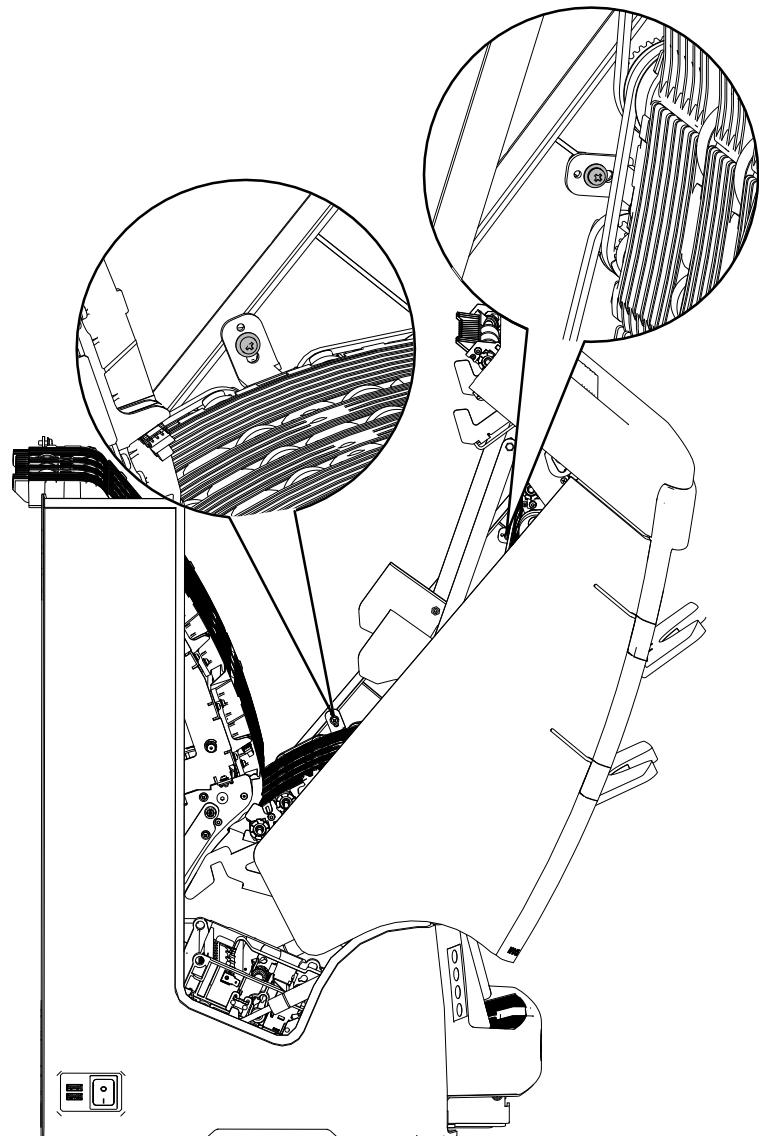
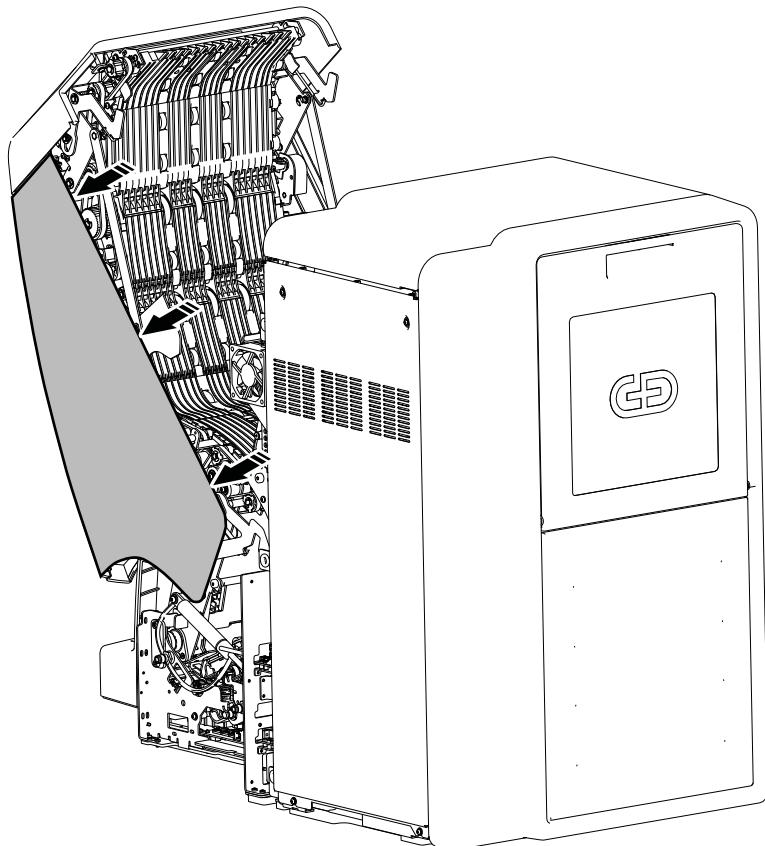


Figure 24: Rear Cover Removal

- [1] Remove the screws (1) from inside.

3



[2] Pull and remove the cover as shown.

Result

⇒ The rear cover is removed.



Important!

There are rubber snap locks for cover fixing. Check and replace if any loose/damaged.

3.8.1.8 Removing the Singler Cover

Requirements

- The BPS C5 is switched Off
→ *Section 5.1.1 “Switching BPS C5 On and Off”, p. 63*
- The feeder plate assembly is removed
→ *Section 5.2.1 “Removing the Feeder Plate Assembly”, p. 71*
- The dust tray is removed.
→ *Section 3.8.1.1 “Removing the Dust Tray”, p. 31*

Procedure

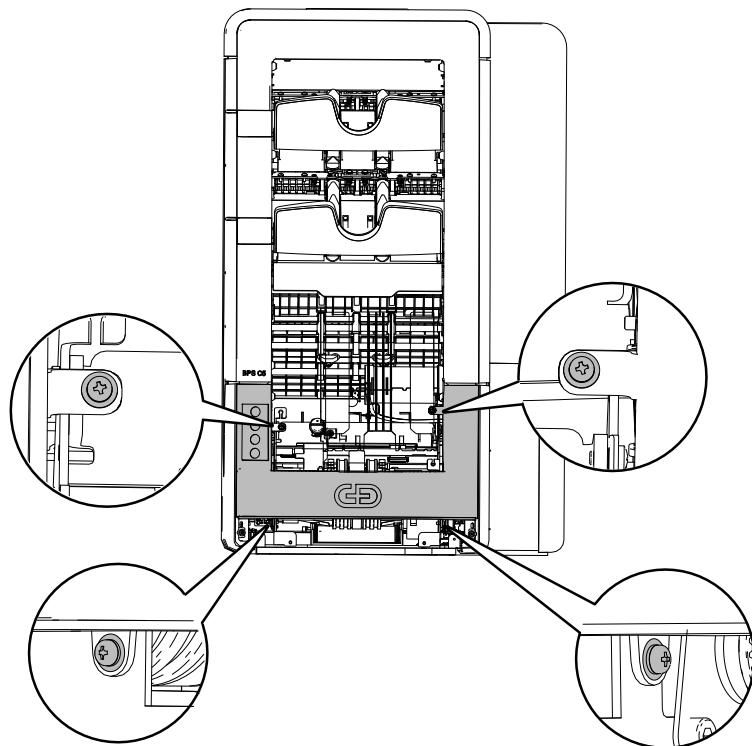
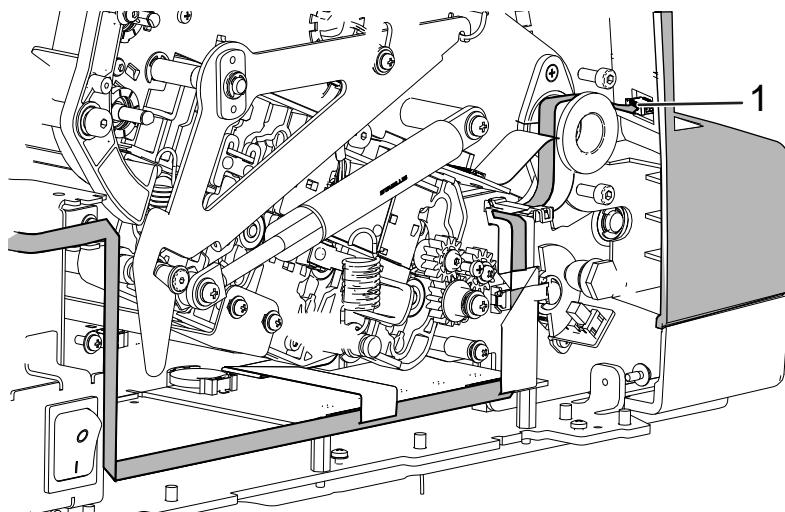


Figure 25: Singler Cover Removal

- [1] Remove the screws.



- [2] Gently, Pull the singler cover to disconnect the connector (1) from the key pad (base cover is not shown for clarity).
- [3] Remove the singler cover from the BPS C5.

Result

⇒ The singler cover is removed.

3.8.1.9 Removing U Cover

Requirements

- The BPS C5 is switched Off.
→ *Section 5.1.1 “Switching BPS C5 On and Off”, p. 63*
- Unplug the power plug from the power socket and secure the machine/device against being switched back on.
- The BPS C5 is opened.
→ *Section 5.1.2.1 “Opening Input Module (IM)”, p. 65*
- The top cover is removed.
→ *Section 3.8.1.2 “Removing the Top Cover”, p. 32*

3

Procedure

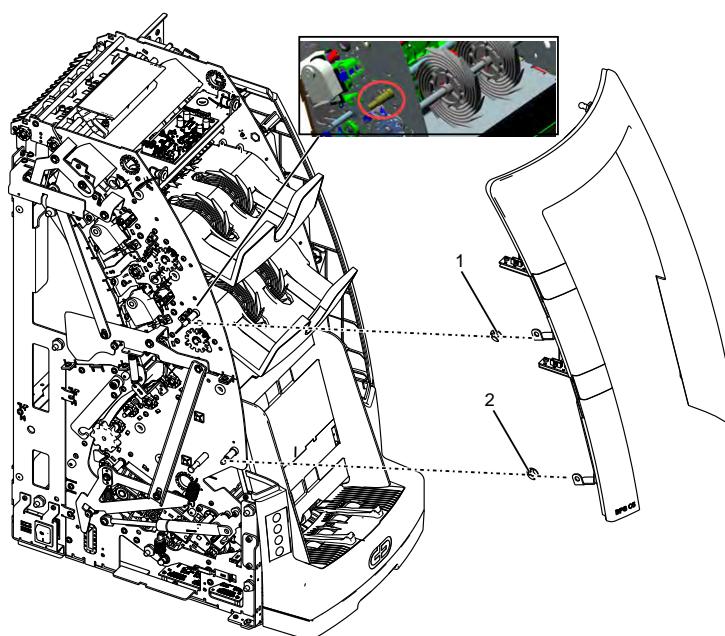
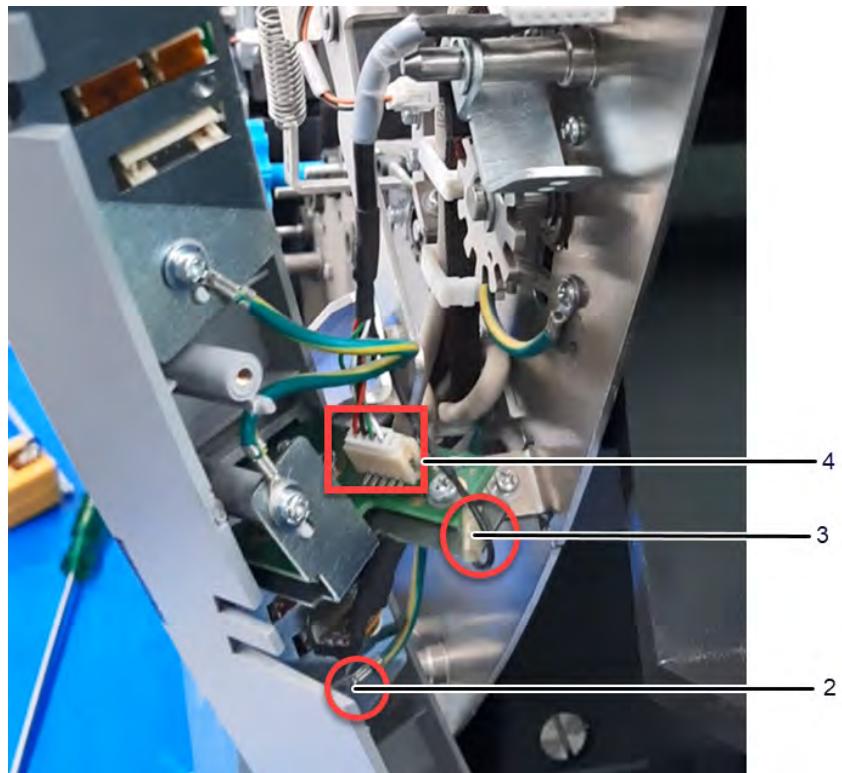


Figure 26: U Cover Removal

- [1] Remove the screw and circlips (1, 2) on both sides.
- [2] Detach the cover.
To detach, pull the cover from the top near to the snap lock for easy removal.

**Important!**

Ensure that the connections are not damaged.



- [3] Disconnect the ground cables (2, 3) for both the stackers.
- [4] Remove the connector (4) for both the stackers.
- [5] Remove the U cover.

Result

⇒ The U cover is removed.

**Important!**

There are rubber snap locks (2) for the cover fixing. Check and replace if any loose/damaged.

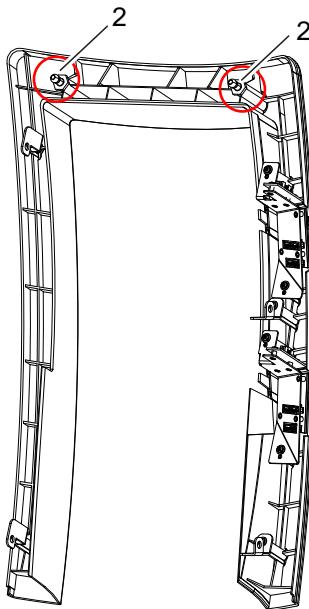
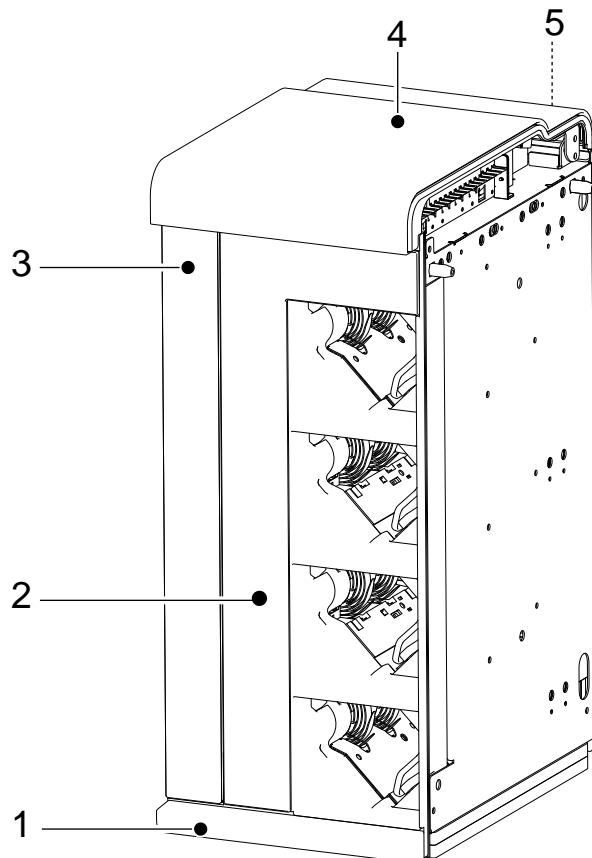


Figure 27: Snap Locks

While installing the cover, align the rubber snap locks properly and then press the cover.

3.8.2 Standard Delivery Module Covers



3

Figure 28: Standard Delivery Module Covers

- 1 Bottom Cover
- 2 Front Cover
- 3 Vertical Transport Door
- 4 Horizontal Transport Door
- 5 Rear Cover

3.8.2.1 Removing the Bottom Cover

Requirements

- The BPS C5 is switched Off.
→ *Section 5.1.1 "Switching BPS C5 On and Off", p. 63*

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Procedure

3

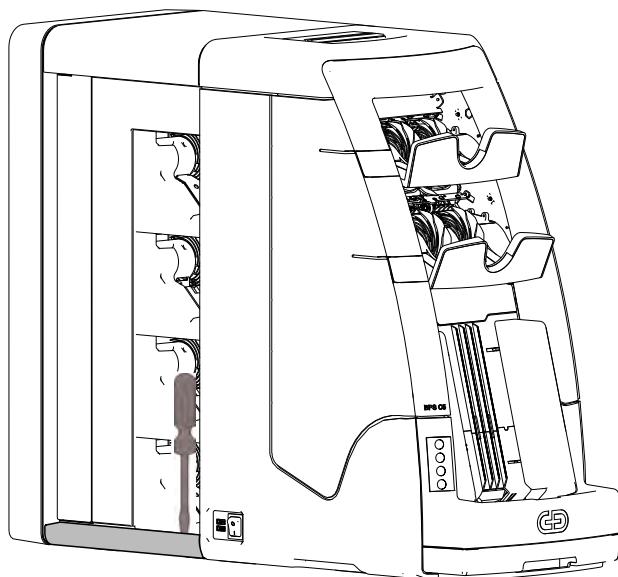


Figure 29: Bottom Cover Removal

- [1] Using the flat screw driver, pull and remove the bottom cover from the SDM.

Result

- ⇒ The SDM bottom cover is removed.

**Important!**

There are rubber snap locks for the cover fixing. Check and replace if any loose/damaged.

3.8.2.2 Removing the Rear cover

Requirements

- The BPS C5 is switched Off.

→ *Section 5.1.1 “Switching BPS C5 On and Off”, p. 63*

Procedure

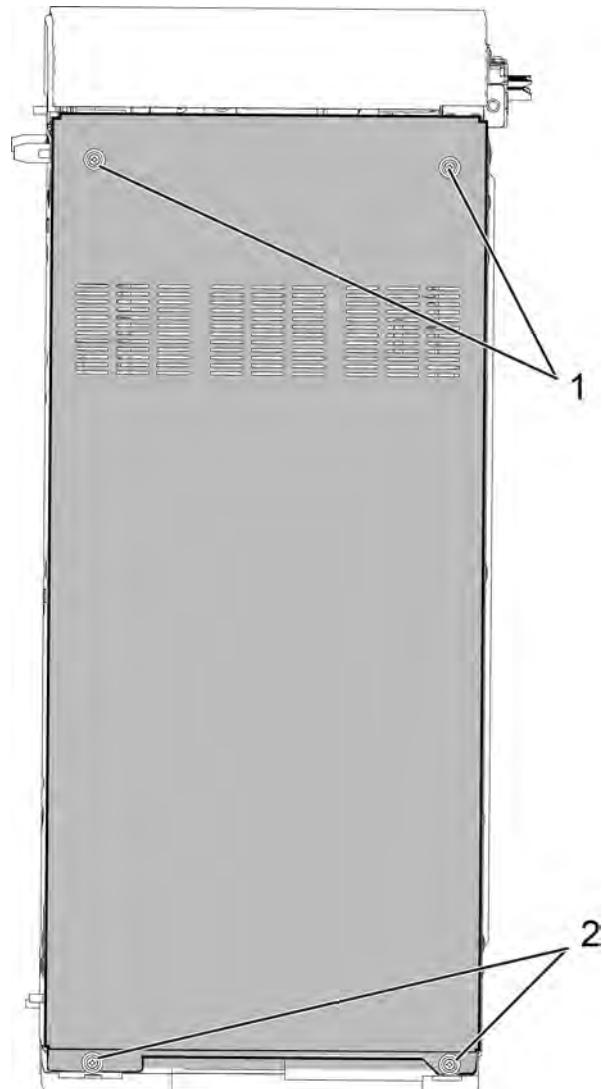


Figure 30: Rear Cover Removal

- [1] Remove the upper screws (1).
- [2] Loosen the lower screws (2).
- [3] Lift and remove the SDM rear cover.

Result

⇒ The SDM rear cover is removed.

3.8.2.3 Removing the Vertical Transport Door

Requirements

- The BPS C5 is switched Off.
→ *Section 5.1.1 “Switching BPS C5 On and Off”, p. 63*
- The horizontal transport door is opened.
→ *Section 5.1.2.2 “Opening Horizontal Transport Path of Standard Delivery Module (SDM)”, p. 66*
- The vertical transport door is opened.
→ *Section 5.1.2.3 “Opening Vertical Transport Path of Standard Delivery Module (SDM)”, p. 67*

Procedure

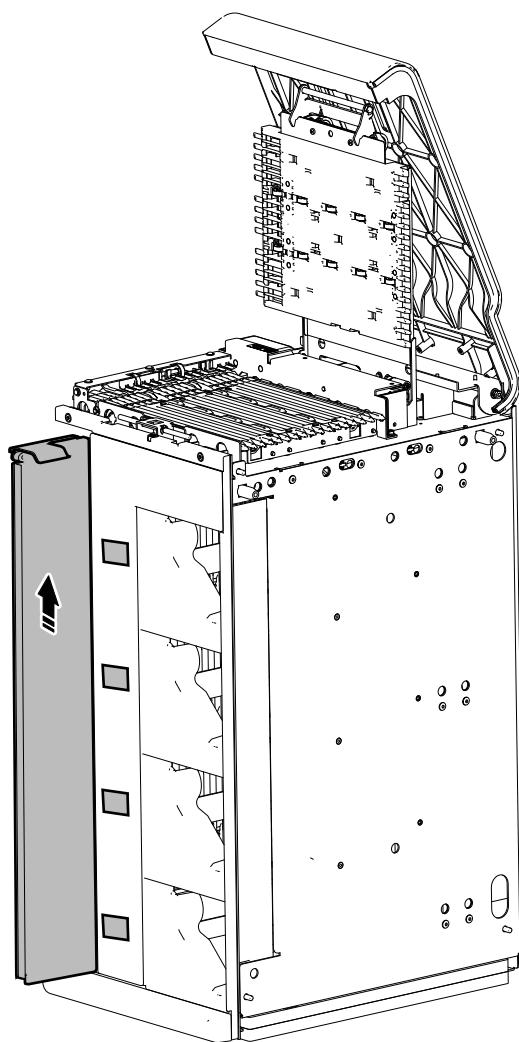


Figure 31: Vertical Transport Door Removal

- [1] Lift the vertical door 5 mm upwards and remove it out.

Result

- ⇒ The vertical transport door is removed.

3.8.2.4 Removing the Horizontal Transport Door (SDM)

Requirements

- The BPS C5 is switched Off.
→ *Section 5.1.1 “Switching BPS C5 On and Off”, p. 63*
- The horizontal transport door is opened.
→ *Section 5.1.2.2 “Opening Horizontal Transport Path of Standard Delivery Module (SDM) ”, p. 66*

Procedure

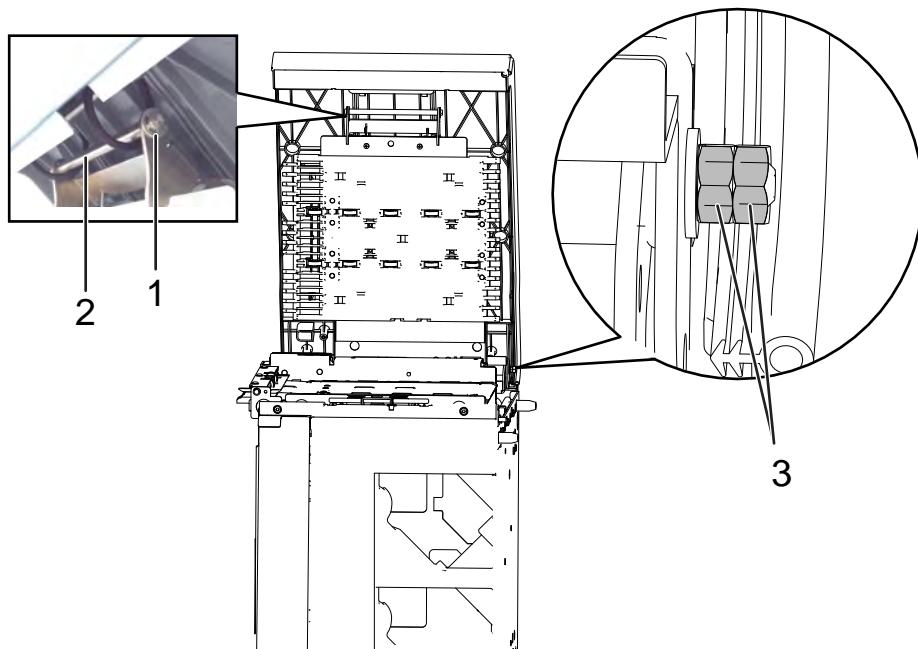
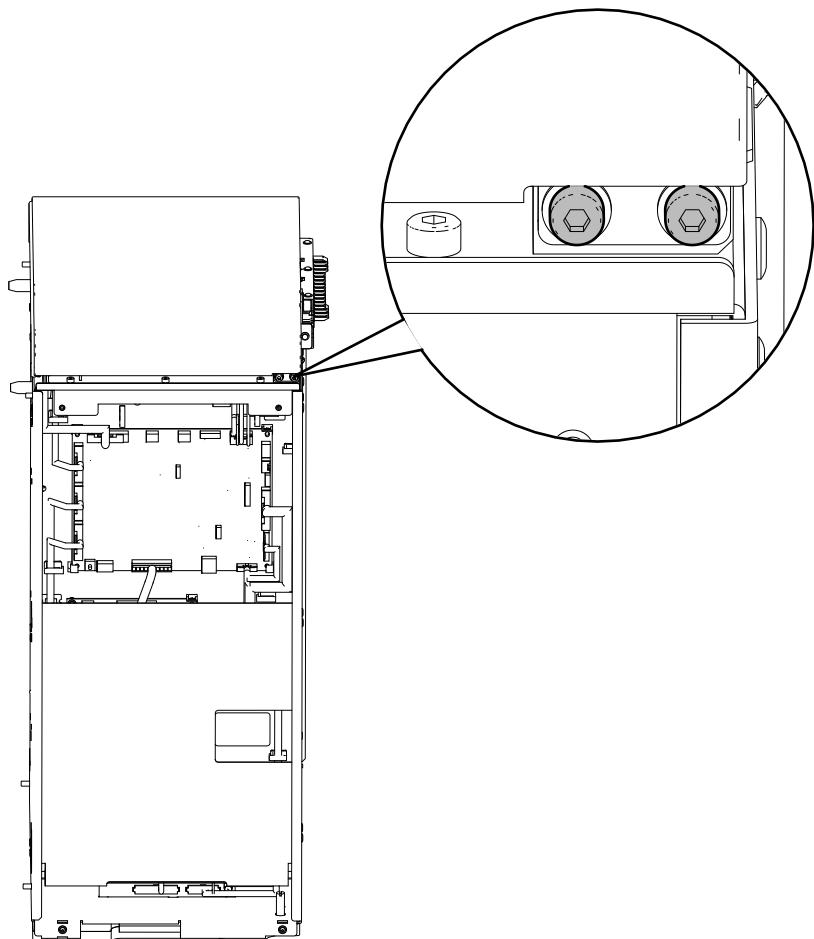


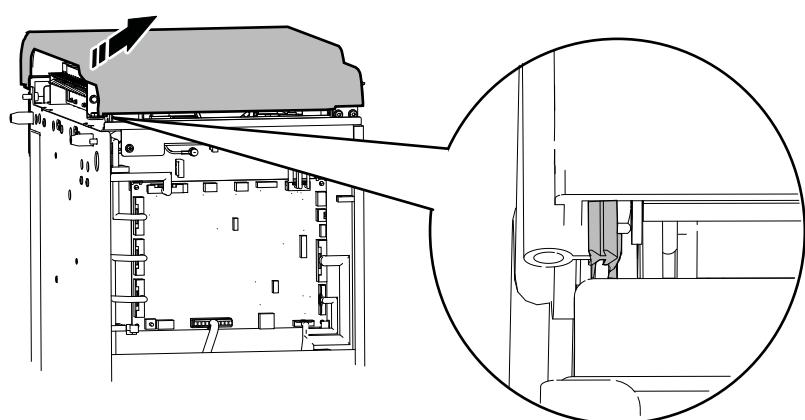
Figure 32: Horizontal Door Removal

- [1] Remove the circlips (1) on both sides.
- [2] Remove the shaft (2) from the O-rings of the door.
- [3] Remove the nuts (3) from the horizontal transport door.
- [4] Close the door.
- [5] Remove the rear cover.
→ *Section 3.8.2.2 “Removing the Rear cover”, p. 50*

3



[6] Remove the screws.



[7] Remove the horizontal transport door from the hinge side as shown.

Result

⇒ The horizontal transport door is removed.

3.8.2.5 Removing the Front Cover

Requirements

- The bottom cover is removed.
→ *Section 3.8.2.1 "Removing the Bottom Cover", p. 49*
- The vertical transport door is removed.
→ *Section 3.8.2.3 "Removing the Vertical Transport Door", p. 52*
- The horizontal transport door is opened.
→ *Section 5.1.2.2 "Opening Horizontal Transport Path of Standard Delivery Module (SDM) ", p. 66*

Procedure

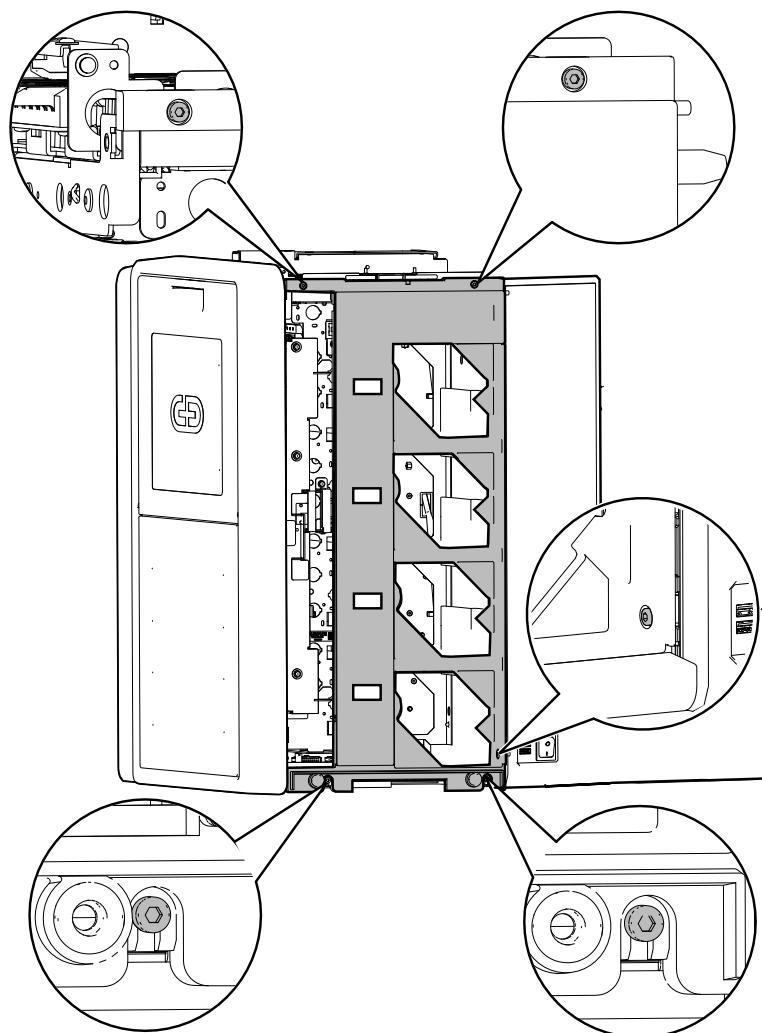


Figure 33: Front Cover Removal

- [1] Remove the screws.
- [2] Pull and remove the SDM front cover.

Result

⇒ The SDM front cover is removed.

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4 Service Tools

4.1 Hardware Tools

For the parts replacement, the following tools list is required.

Sl.No	Tool	Description/Specification
1	Phillips head screwdriver	The different types of phillips head screwdrivers used are: 1. PH1 Black tip 2. PH2 Black tip
2	Phillips head screw driver (Stubby handle)	PH2 Stubby handle - used for enclosure removal
3	Torx screwdriver	The different types of torx screwdrivers used are: 1. T6 - used for BASB & Encoder 2. T8 - used for brush roller drive pulley assembly 3. T10 4. T20 - used for sensor roller lock removal
4	Allen/Hex key	The different types of hex keys used are: 1. 1.5 mm (L) - used for grub screws in Motor and Singler 2. 2.5 mm (Extended length round headed L) - used for DMAB 3. 3.0 mm (Extended length round headed L)- used for singler 4. 4.0 mm (Extended length round headed L) - used for SDM to IBM
5	Spring scale	5 N
6	Flat screwdriver	1.5 mm - used for E clip removal

Sl.No	Tool	Description/Specification
7	Hook Spring	520347001
8	Hexagonal L- Shaped Wrench	2 mm (used for SDM)
9	Long nose plier	170 mm (used for SDM)
10	Phillips head screwdriver (Extended length.)	No.2, 300 mm long (use for SDM)
11	Screwdriver	Slotted type (use for SDM)
12	Wrench	7 mm, 24 mm (used for foot adjustment) (for SDM)
13	Pliers	The different types of pliers used are: 1. Long-Nose type (use for SDM) 2. With joint cutter 3. Circlip Pliers (External - Straight Nose) - Used for Circlip removal 4. Long nose plier (170 mm) - used for SDM
14	Nippers	Use for SDM
15	Scale	Use for SDM
16	Pen Light	Use for SDM
17	Phillips head screwdriver	No.2, 350 mm long (use for SDM)
18	Box type wrench	M4 and M5 (use for SDM)
19	Combination Spanner	The different types of combination spanners used are: 1. 7 mm - used for singler tuning, and SDM (M4) 2. 8 mm - used for SDM (M5)

Sl.No	Tool	Description/Specification
20	T Handle Hex Key	<p>The different types of T handle hex key used are:</p> <ol style="list-style-type: none">1. 2.5 mm - used for sensor housing2. 3.0 mm - used for chassis

4.2 Software Tools

4

- To improve the efficiency of the BPS C5, the following diagnostic tools are used.
- Improved Recording Tool (IRT)
- The IRT records the raw data of the banknotes processed in the BPS C5. Raw data that are recorded by IRT are used for creating or fine-tuning adaptation.
- To install and run IRT, you must have a PC with:
- Microsoft Windows 7, 64 bit operating system or above
 - Admin rights
 - Microsoft .NET Framework installed separately
- IRT is contained in a single setup file. Run the setup file to install IRT. It is recommended to install into the proposed path (Microsoft Windows default application path).
- *Section 7.13 “Improved Recording Tool (IRT)”, p. 221*
- BPS Eco-Configurator
- The BPS Eco-Configurator is a comprehensive and interactive tool for configuring the following features of the BPS C5.
- Add, update, or remove currency adaptation packages
 - Create and configure operating modes
 - Configure thresholds
 - Group reject reasons
 - Configure customer-specific settings for reports
- For more information on The BPS Eco-Configurator, refer to the BPS Eco-Configurator User Manual.
- MoveM Calfilebuilder
- The MOVEM Calfilebuilder tool is used to generate the MTS Calibration (.cal) file. The Calfilebuilder tool converts the raw data (.nif file) of the MTS calibration documents to the .cal file, which is required to calibrate the MTS sensor of the BPS C2/C5.

MoVEm Function Check

The MoVEm Calffilebuilder tool is hosted in the cloud location <https://citads.capaas-cloud.com/calffilebuilder>. You can upload the .nif in this location and generate the .cal file.

→ *Section 7.9 “Calibrating the Sensor - MTS (Mechanical Thickness Sensor)”, p. 212*

The MoVEm Function Check tool verifies whether a sensor function test is successful. If the sensor function test fails, the tool displays the failure reasons. The .nif file, that is created during sensor function test, is used for the sensor analysis.

The MoVEm Function Check tool is hosted in the cloud location <https://citads.capaas-cloud.com/functioncheck>. You can upload the .nif in this location. If the sensor function test is successful, a message is displayed. If the test is unsuccessful, the failure causes are listed.

→ *Section 7.10 “Testing the Sensor (Functional Test)”, p. 215*

5 Parts Replacement

This chapter describes how to replace the parts for service of the BPS C5.

In this chapter, you will find the following information:

- Tools
 - *Section 4.1 "Hardware Tools", p. 57*
- Requirements for Parts Replacement
 - *Section 5.1 "Requirements for Parts Replacement", p. 61*
- Removing the parts
- System Adjustment
 - *Chapter 6 "System Adjustment", p. 173*

5

5.1 Requirements for Parts Replacement

You will find step-by-step descriptions for removal of all components concerned.

The following requirements must be satisfied for all works.



DANGER

Danger of electric shock

Danger of death or serious injury from electric shock

1. Before starting any work, switch off the machine/device.
2. Disconnect the machine from the power supply.
3. Secure the machine/device against being switched back on.



CAUTION

Danger of crushing when closing the machine

Danger of trapped fingers

When closing, be careful not to crush your fingers.



NOTICE

Static electricity

can cause permanent damage to electronic components.

Attach an anti-static band around your wrist. Attach the clip to a grounded metal object.

If you do not use an anti-static band, you should "discharge" yourself by touching a grounded metal object before touching the electronic components.

**NOTICE**

Incorrect handling
can cause permanent damage to circuit boards.

When replacing parts, if possible only hold the circuit board by the connectors.

Avoid touching the circuit board itself.

**Important!**

Assembly is in the logical reverse order. Installation is only described in special cases or when the procedure is different.

**CAUTION**

Danger of burns

During operation of machine in service mode, freely accessible parts may heat up.

1. Make sure that no one is in the immediate vicinity of the machine.
2. Do not touch any parts that heat up during operation.
3. Before the machine is released for use by the operator again, deactivate service mode and put all protective elements back in place.

Ergonomics

Stand or sit in a comfortable manner. Make the appropriate adjustments for your work area.

Non-specified materials

Additional dangers may result from the use of non-specified materials such as cleaning agents, sprays, lubricants, etc.

Sharp edges

Special care is required when cleaning or checking parts with sharp edges.

Dust

Never use compressed air to clean the banknote processing machine. Breathing in dust can lead to health problems. Furthermore, the whirling dust may also cause damage to the bearings and electronic parts. No claims can be made under the guarantee for parts damaged in this way. Therefore, vacuum any dust with a suitable vacuum device, fitted with a micro-filter.

5.1.1 Switching BPS C5 On and Off

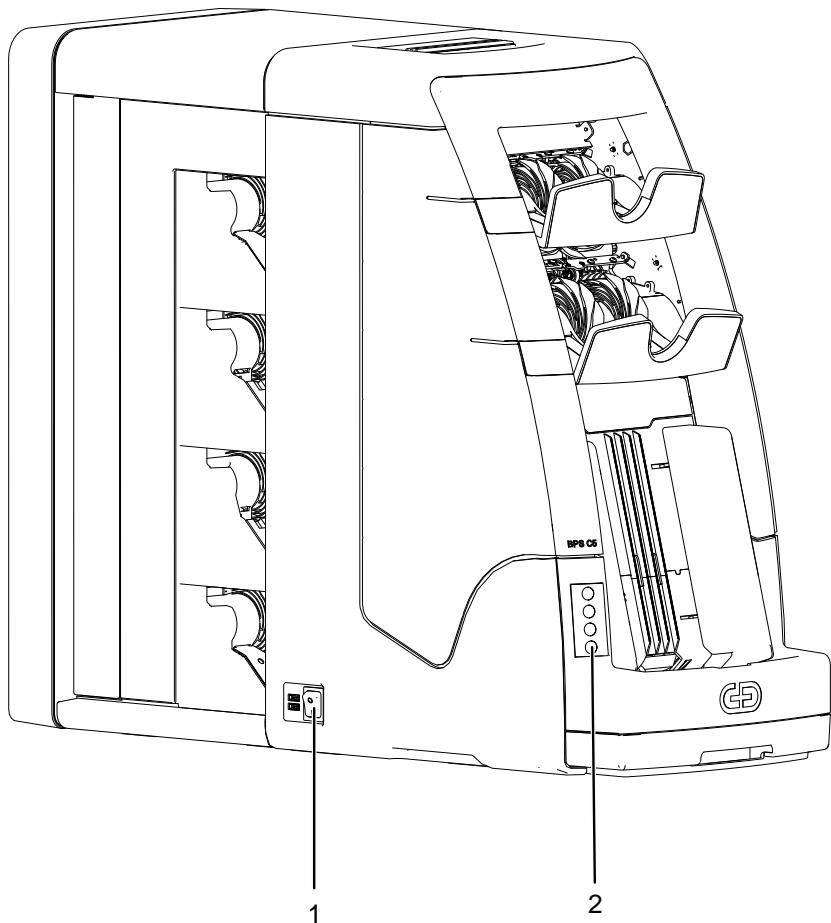


Figure 34: Power Switch

- 1 Power Switch
- 2 Power Soft Key

Requirements

- The BPS C5 is connected to the power supply.
→ *BPS C5 Installation Manual*

Switching On

- [1] Switch on the power (1).
- [2] Press  (2).

Result

- ⇒ After the BPS C5 starts, the login screen is displayed.

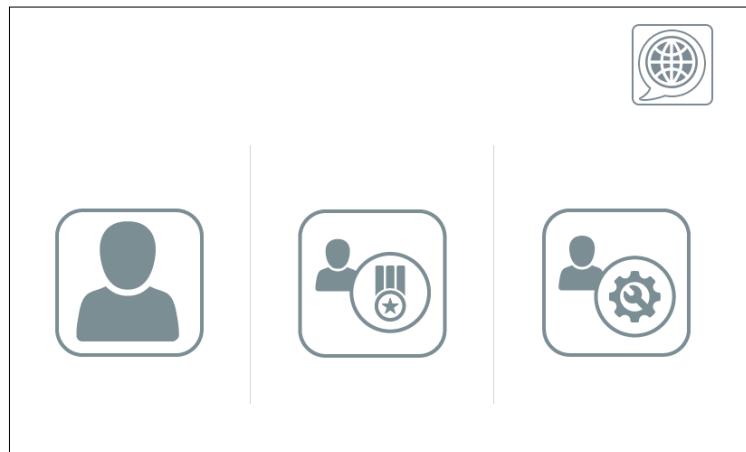


Figure 35: Login Screen

5

Switching Off

**Important!**

All unsaved results will be deleted when the BPS C5 is switched off.

[1]

Press the  (2).

⇒ The power soft key starts blinking.

[2]

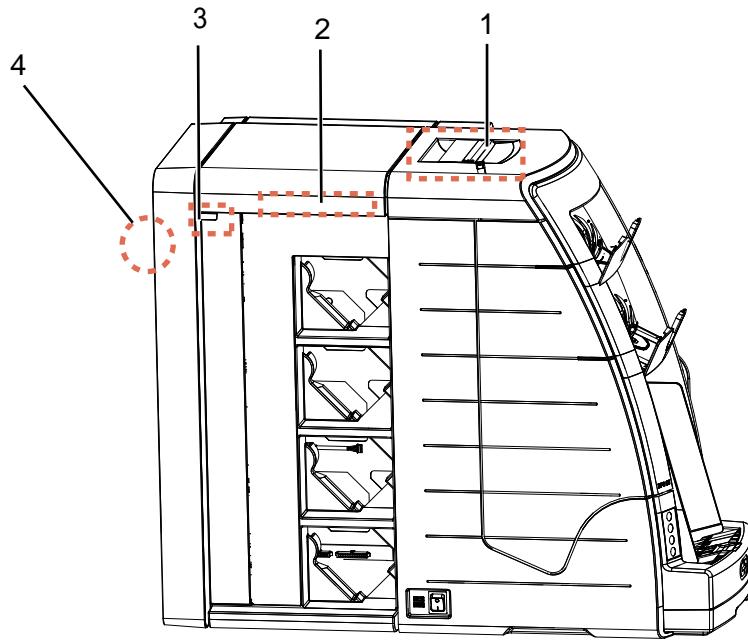
Switch off the power (1).

Result

⇒ The BPS C5 is switched off.

5.1.2 Opening and Closing BPS C5

You are required to open the BPS C5 for cleaning or banknote jam recovery.



5

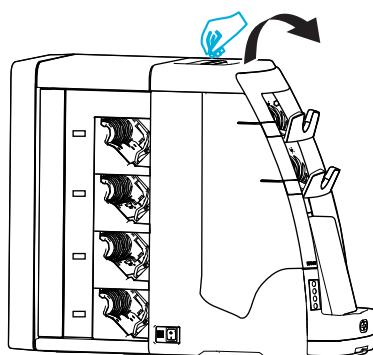
Figure 36: BPS C5 Opening Areas

There are four areas of opening the BPS C5:

1. Input Module
2. SDM horizontal transport path
3. SDM vertical gate
4. Fail-safe module

5.1.2.1 Opening Input Module (IM)

Procedure



[1] Pull up the latch handle and pull the front module forward.

Result

⇒ The IM is open.

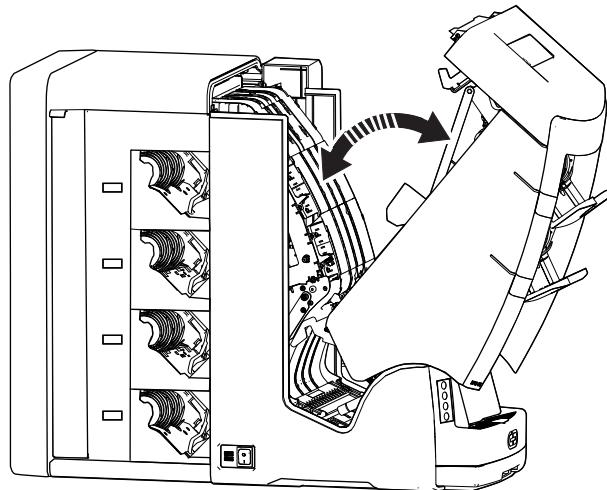


Figure 37: IM Opened

5

5.1.2.2 Opening Horizontal Transport Path of Standard Delivery Module (SDM)

Procedure



NOTICE

System malfunction caused by opening the transport door

Opening the transport door during banknote processing causes to banknote jam.

Never open the transport door during banknote processing.

- [1] Open the **Horizontal Transport Door** of the SDM.

Result

- ⇒ The horizontal transport path is opened.

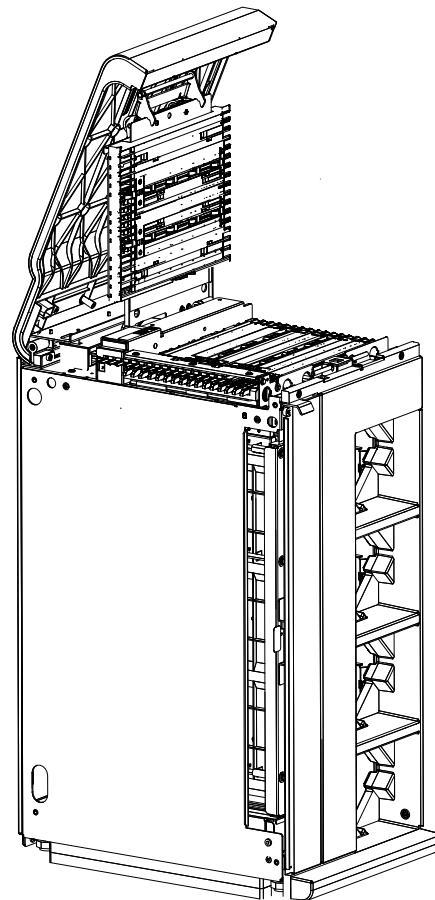


Figure 38: Horizontal Path Opened

5.1.2.3 Opening Vertical Transport Path of Standard Delivery Module (SDM)



NOTICE

System malfunction caused by opening the transport door

Opening the transport door during banknote processing causes to banknote jam.

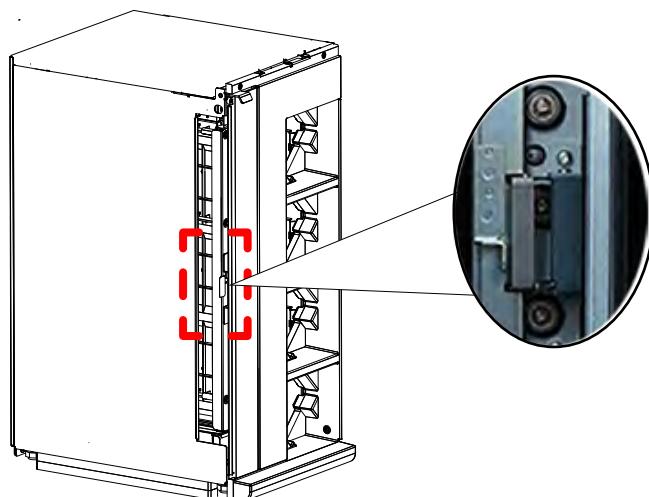
Never open the transport door during banknote processing.

Procedure



- [1] Open the **Vertical Transport Door** of the SDM.

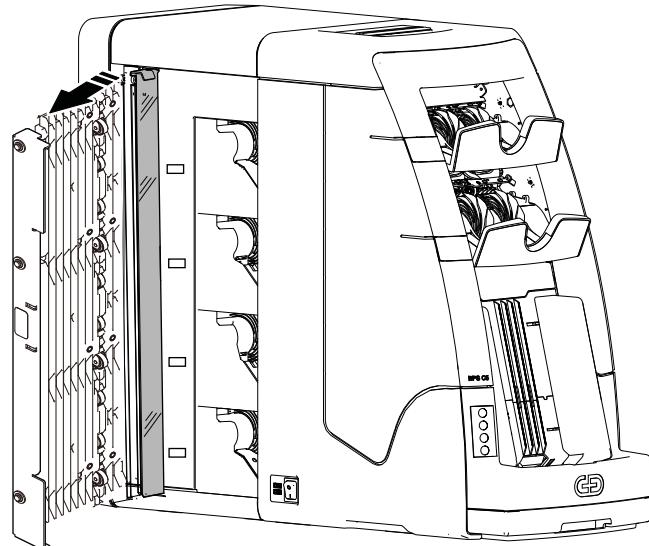
5



- [2] Unlock the lever to pull the transport path out.

Result

- ⇒ The vertical transport path is opened.



5

Figure 39: Vertical Path Opened

5.1.2.4 Opening Fail-safe Compartment

Procedure

- [1] Open the fail-safe cover.

Result

- ⇒ The fail-safe compartment is open.

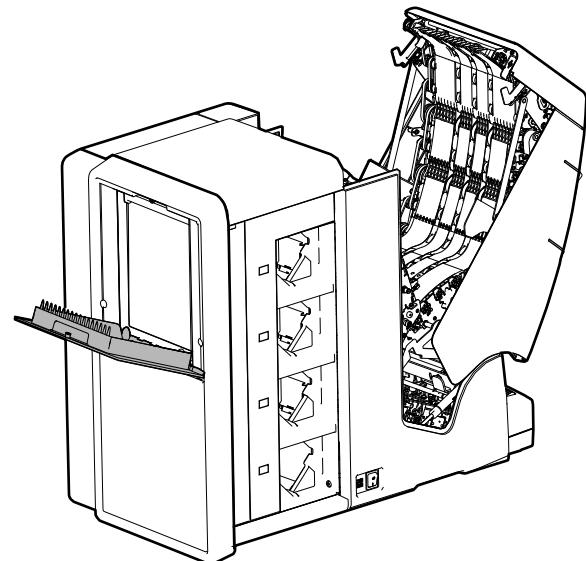


Figure 40: Failsafe Opened

5.1.2.5 Closing BPS C5

Requirements

- The BPS C5 opened
→ Section 5.1.2.1 “Opening Input Module (IM)”, p. 65

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**CAUTION**

Danger of crushing when closing the machine

Danger of trapped fingers

When closing, be careful not to crush your fingers.

Procedure

[1] Close the fail-safe compartment.

[2] Insert the vertical transport path.

[3] Lock the vertical transport path lever.

**CAUTION**

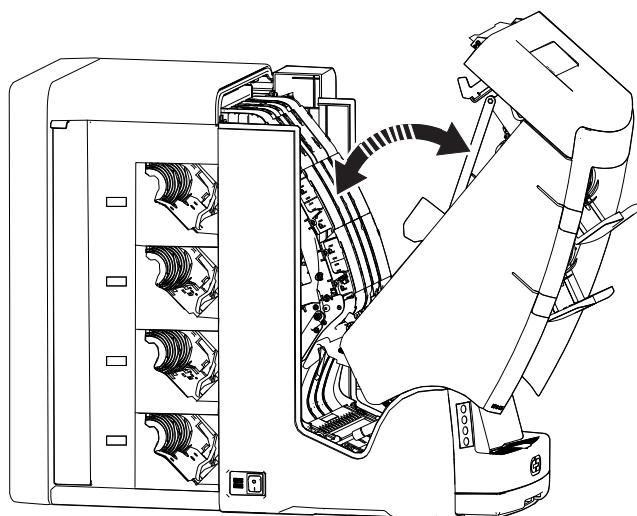
Danger of crushing when closing the flap or door

Danger of trapped fingers

When closing the flap or door, be careful not to crush your fingers.

[4] Close the **Vertical Transport Door**.

[5] Close the **Horizontal Transport Door**.



[6] Push the front module of the IM back.

**Important!**

Ensure that the front module engages properly, not until you hear the latch click sound.

Result



The BPS C5 is closed when you hear a click sound.

5.2 Replacing Parts in the Singler Module

The singler module is a sub-system of BPS C5. The BPS C5 has a friction type singler and functions to single out unbundled banknotes stacked in the singler area.

The singler module consists of the following main parts/sub-systems.

- Feeder plate assembly
- Singler drum assembly
- Hopper wheels assembly
- Retarding wheel assembly
- Guide Roller Assembly (1R 16MM)
- Roller Assembly (3R 1G)
- Singler motor

**Important!**

Ensure that the front module is supported while removing the singler and Input Coupling Module in set.

The singler module is removed when:

- The spare parts in the singler module needs replacement
- The singler needs adjustments, if required

5.2.1 Removing the Feeder Plate Assembly

Requirements

- The BPS C5 is switched Off and the main power plug is removed from the socket .

→ *Section 5.1.1 "Switching BPS C5 On and Off", p. 63*

Procedure

5

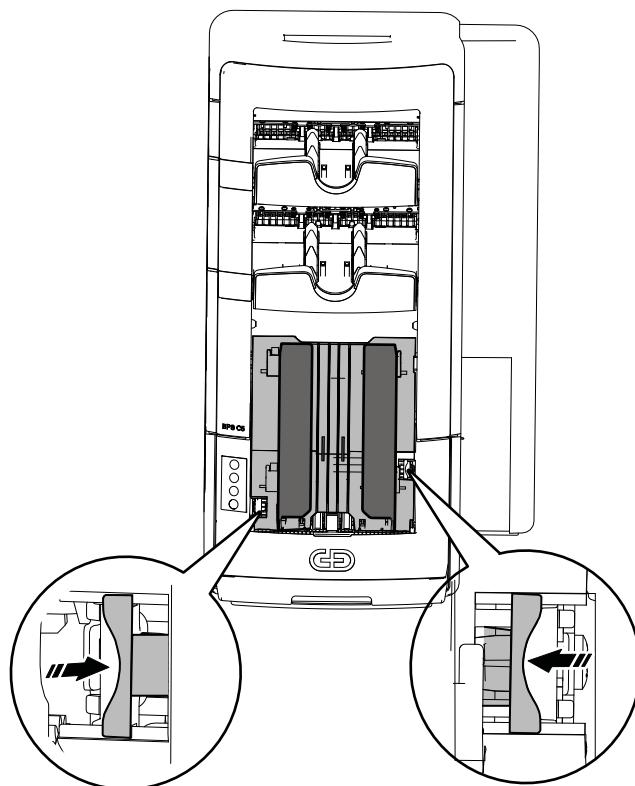


Figure 41: Feeder Plate Assembly Removal

- [1] Slide the guide/feeder plates inward.
- [2] Simultaneously, press the lock tabs inward and then remove the feeder plate assembly from the BPS C5.

Result \Rightarrow The feeder plate assembly is removed.

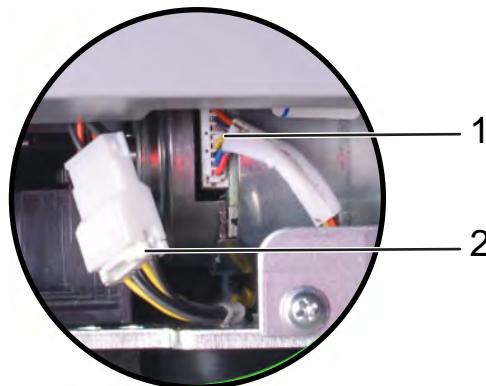
5.2.2 Removing the Singler Module

This procedure shows how to remove the singler module from the BPS C5.

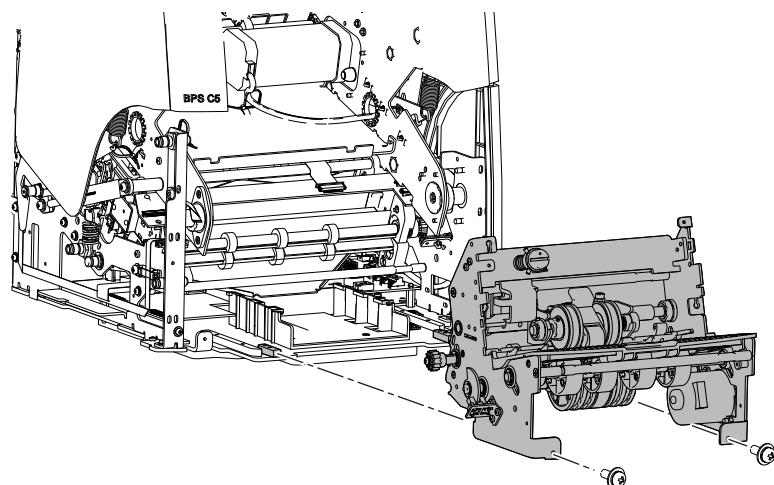
Requirements

- The singler cover is removed.
→ *Section 3.8.1.8 “Removing the Singler Cover”, p. 44*

Procedure



- [1] Unplug the motor connector (1) and the PD connector (2) from the singler.



- [2] Remove the two screws.
[3] Slide and remove the singler module.

Result

⇒ The singler module is removed.

5.2.3 Replacing the Singler Drum Assembly

Requirements

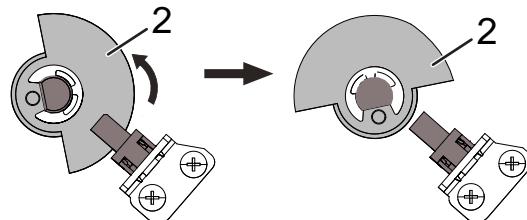
- Singler module is removed
→ *Section 5.2.2 "Removing the Singler Module", p. 72*

Procedure

- [1] Remove the circlips (1) on both sides.

**Important!**

Ensure that the sensor flag (2) away from the photo detector. Rotate the singler drum shaft so that the sensor flag (2) is away from the photo detector.



[2] Remove the sensor flag (2).

[3] Remove the circlip (3).

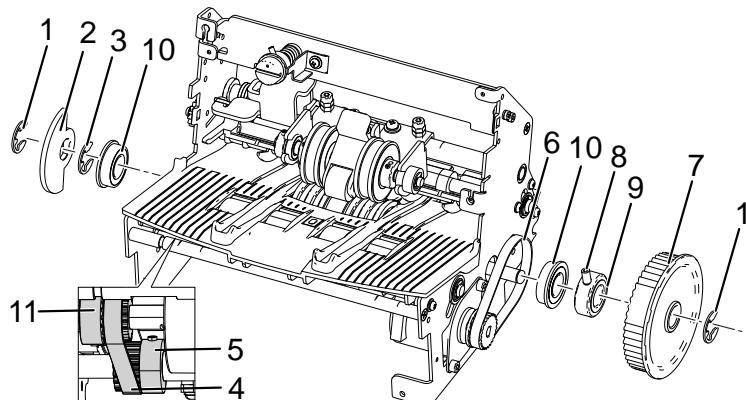


Figure 42: Singler Drum Assembly Removal

**Important!**

As the timing belt (4) is mounted on the timing belt pulley (11) of the hopper wheels assembly, it cannot be dismounted completely from the singler.

- [4]** Dismount the timing belt (4) from the timing belt pulley (5) of the singler drum assembly.
- [5]** Remove the timing belt pulley (7) along with the timing belt (6).
- [6]** Loosen the grub screw (8) and then remove the bearing lock (9) along with it.
- [7]** Remove the bearings (10) on both sides of the singler shaft.

- [8] Hold and remove the singler drum assembly from the singler module.

Installing the Singler Drum Assembly

- [9] Insert the singler drum assembly through the timing belt (4).

For the installation, follow the removal instructions in reverse order.



Important!

- Make sure that the inner surface of the bearings (10) touches the side plate of the singler assembly.
- Ensure that the sensor flag (2) is away from photo detector while remounting.
- Make sure that there is no play in the singler drum assembly after the bearing lock (9) is tightened.



Important!

Singler adjustment is required when singler drum assembly/belt is replaced.

→ *Chapter 6 “System Adjustment”, p. 173*

Result

⇒ The singler drum assembly is replaced.

5.2.4 Replacing the Hopper Wheels Assembly

Requirements

- Singler module is removed from BPS C5

→ *Section 5.2.2 “Removing the Singler Module”, p. 72*

Procedure

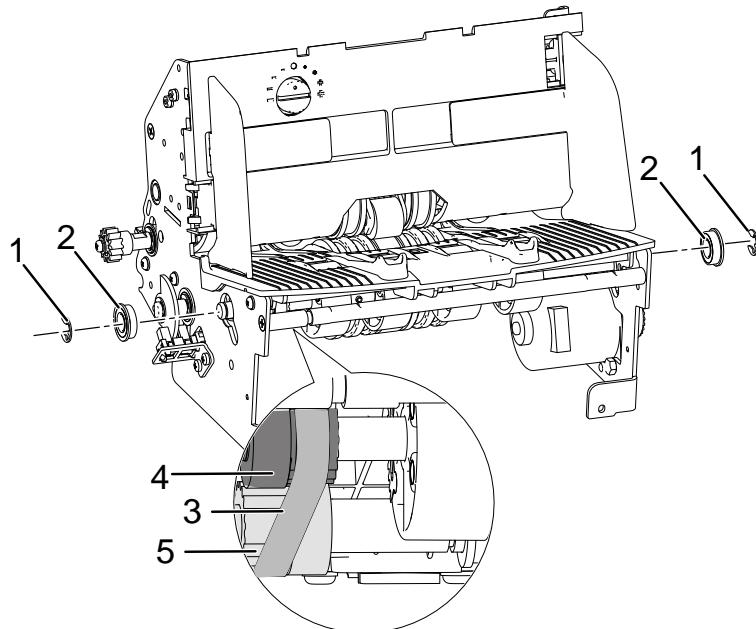


Figure 43: Hopper Wheels Assembly Removal

- [1] Remove the circlips (1) on both sides.
- [2] Remove the bearings (2) on both sides of the hopper wheels assembly.
- [3] Dismount the timing belt (3) from the timing pulley (4) of the hopper wheel assembly.

**Important!**

As the timing belt (3) is also mounted on the timing pulley (5) of the singler drum assembly, it cannot be dismounted completely.

- [4] Hold and remove the hopper wheels assembly from the singler module.

Installing the Hopper Wheel Assembly

- [5] Insert the hopper wheel assembly through the timing belt (3) into the bearings slots.
- [6] For the installation, follow the removal instructions in reverse order.

**Important!**

Make sure that the inner surface of the bearings (2) touches the side plate of the singler assembly.

Singler adjustment (Synchronizing the Singler Drum to the Hopper Wheels) is required when singler hopper wheel assembly/belt is replaced.

→ *Section 6.3 “Synchronizing the Singler Drum and the Hopper Wheels”, p. 184*

Result

⇒ The hopper wheels assembly is replaced.

5.2.5 Replacing the Retarding Wheels Assembly

Requirements

- Singler module is removed from BPS C5

→ *Section 5.2.2 “Removing the Singler Module”, p. 72*

Procedure

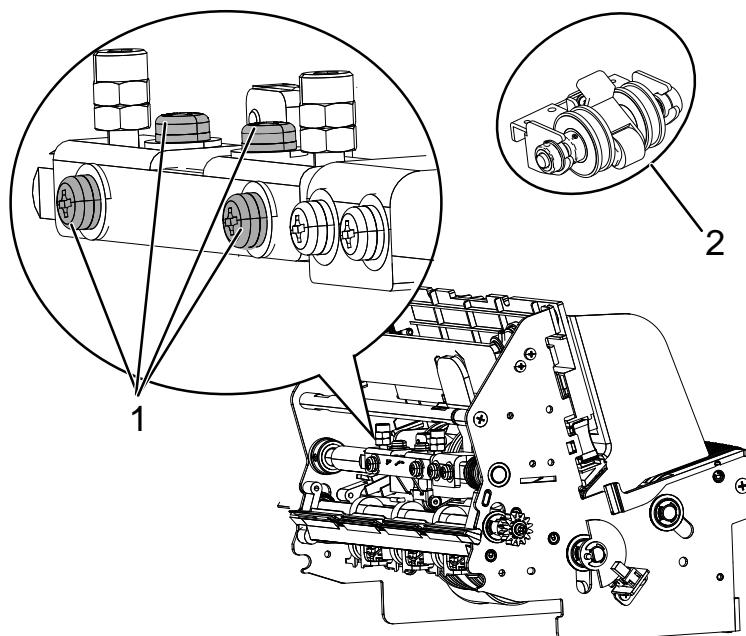


Figure 44: Retarding Wheels Assembly Removal

- [1] Remove the screws (1).
- [2] Remove the retarding wheels assembly (2).

Installing the Retarding Wheels Assembly



Important!

Ensure to loosen the hexagonal locknuts (3) so that the thread of the bolt is inside the retarding wheel frame surface.

- [3] Place the retarding wheel assembly (2).
- [4] For the installation, follow the removal instructions in reverse order.

Result

⇒ The retarding wheels assembly is replaced.



Important!

After the retarding wheels assembly is mounted, adjust the singler.

- *Section 6.1.3 "Adjustments Via Singler Health Option", p. 176*
- *Section 6.1.4 "Adjustments Using Spring Scale", p. 178*
- *Section 6.1.5 "Fine Adjustments of the Singler", p. 181*

5.2.6 Removing the Guide Roller Assembly (1R 16MM)

Requirements

- Singler module is removed from BPS C5
→ *Section 5.2.2 "Removing the Singler Module", p. 72*

Procedure

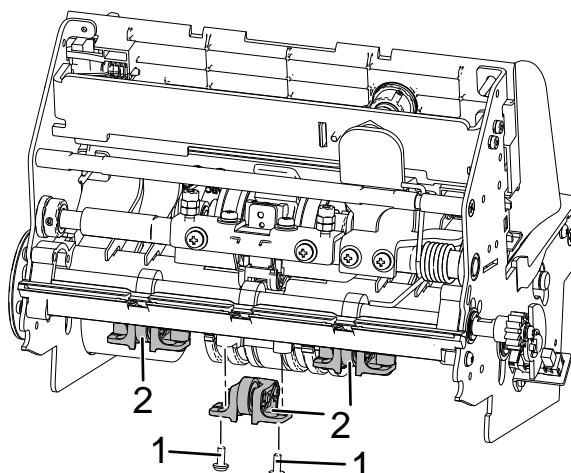


Figure 45: Guide Roller Assembly Removal

- [1] Remove the screws (1).
- [2] Remove the guide roller assemblies (2).

Result

⇒ The guide roller assembly (1R 16MM) is removed.

5.2.7 Removing the Roller Assembly (3R 1G)

Requirements

- Singler module is removed from BPS C5
→ *Section 5.2.2 "Removing the Singler Module", p. 72*
- Spur gear (14T W6) is removed.
→ *Section 5.2.8 "Removing the Spur Gear (14T W6)", p. 79*

Procedure

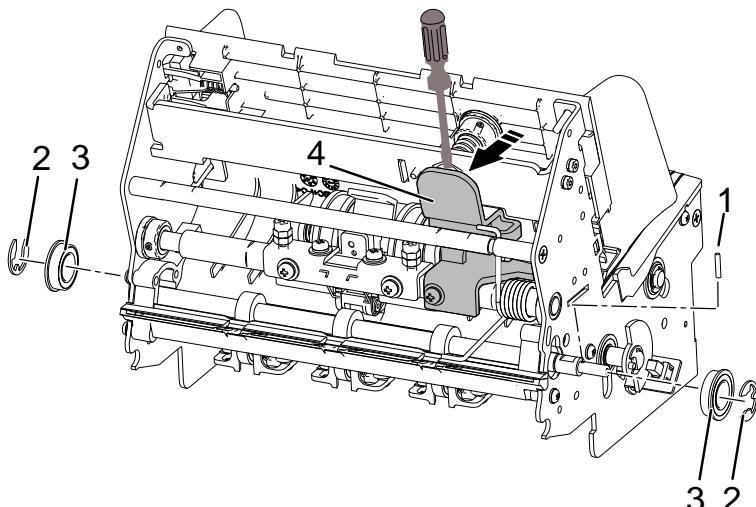


Figure 46: Roller Assembly (3R 1G) Removal

- [1] Remove the locating pin (1).
- [2] Remove the circlips (2) on both sides.
- [3] Remove the bearings (3) on both sides.
- [4] Press the stopper (4) using a flat head screwdriver.
- [5] Remove the roller assembly (3R 1G) from the singler.

Result

⇒ The roller assembly (3R 1G) is removed.

5.2.8 Removing the Spur Gear (14T W6)

Requirements

- Singler module is removed from BPS C5
→ *Section 5.2.2 "Removing the Singler Module", p. 72*

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Procedure

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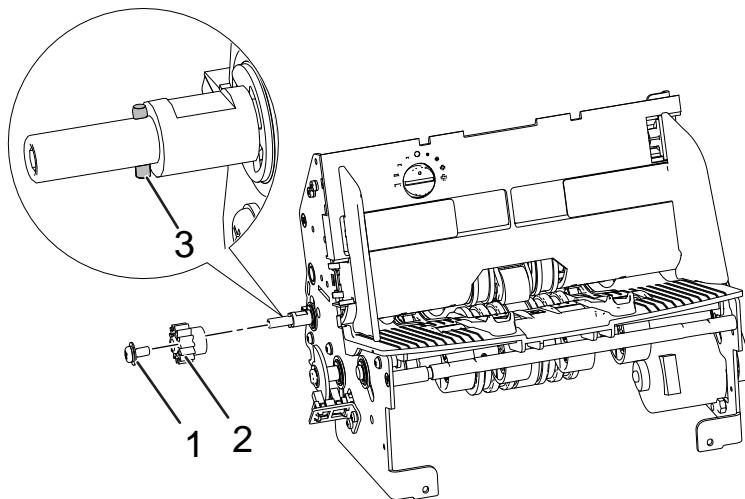


Figure 47: Spur Gear (14T W6) Removal

- [1] Remove the screw (1).
- [2] Remove the spur gear 14T W6 (2) from the locating pin (3) of the roller assembly shaft.

Result

⇒ The spur gear (14T W6) is removed.

5.2.9 Removing the Singler Motor

Requirements

- Singler module is removed from BPS C5

Procedure

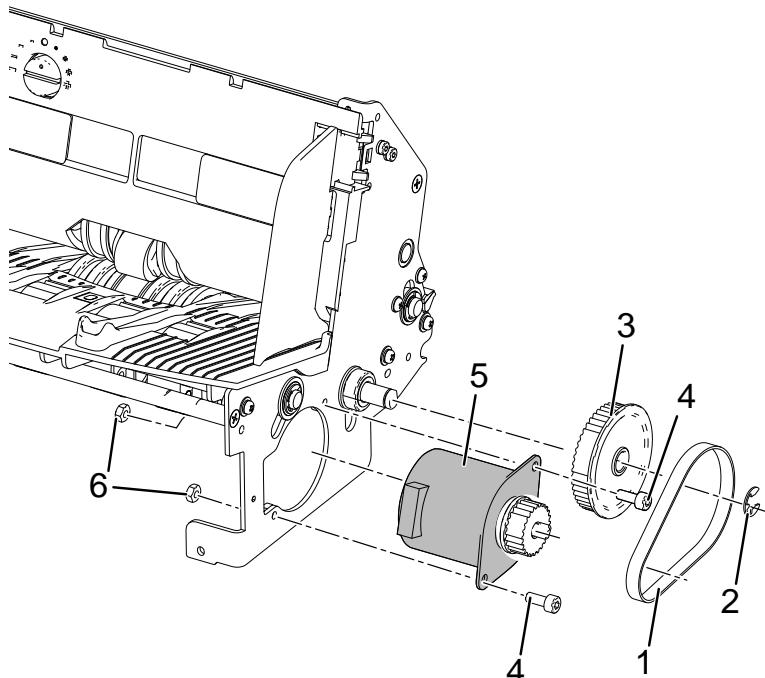


Figure 48: Singler Motor Removal

- [1] Remove the timing belt (1).
- [2] Remove the circlip (2).
- [3] Remove the timing belt pulley (48G 3P 10W) (3).
- [4] Remove the screws (4) with respective nuts (6).
- [5] Remove the singler motor (5) along with timing belt pulley (24G 3P 10W) from the singler module.

Result

⇒ The singler motor is removed.

5.2.10 Replacing the Friction Elements in the Singler

High banknote reject rate for singler related reasons when:

- Banknotes of different formats or multiple currencies/substrates are processed together.
- More than 1200 banknotes are placed into the singler.

The outer friction elements in the hopper assembly may cause skew resulting into higher number of rejected banknotes.

Depending upon the type, use plastic friction element or rubber friction elements to reduce rejection rate.

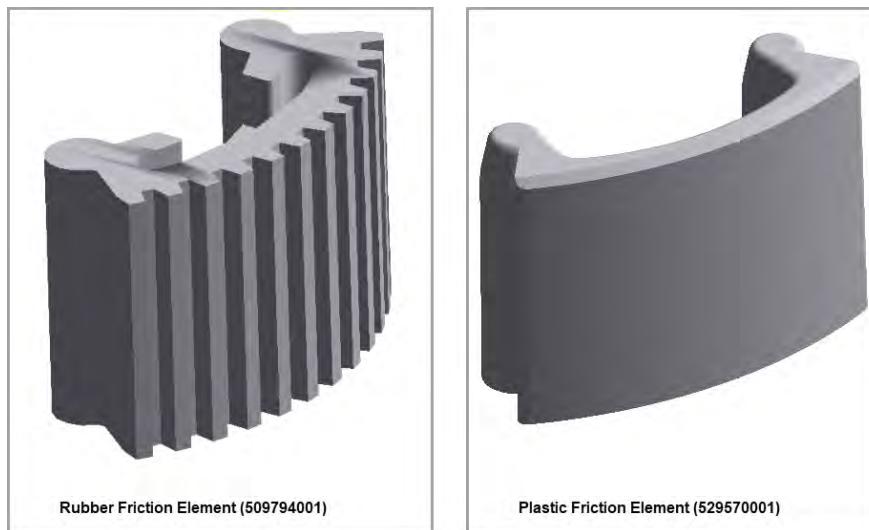


Figure 49: Friction Elements

**Important!**

It is recommended to exchange the friction elements if the operators observe the problem mentioned above.

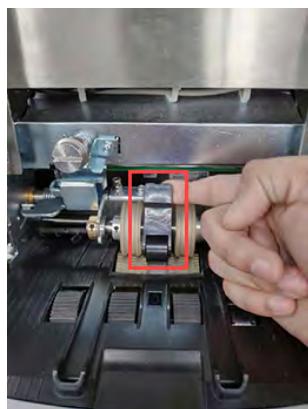
Requirements

- The BPS C5 switched off

Secure the BPS C5 so that it cannot be switched on again.

Installing the Plastic Friction Element

- [1] Remove the feeder plate assembly.

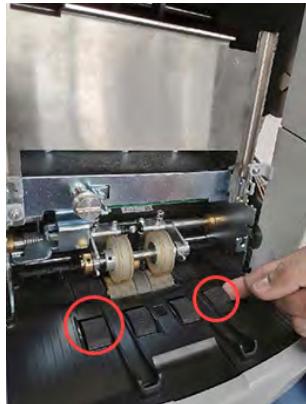


- [2] Remove the feed roller.

To remove, pull the feed roller from the assembly.

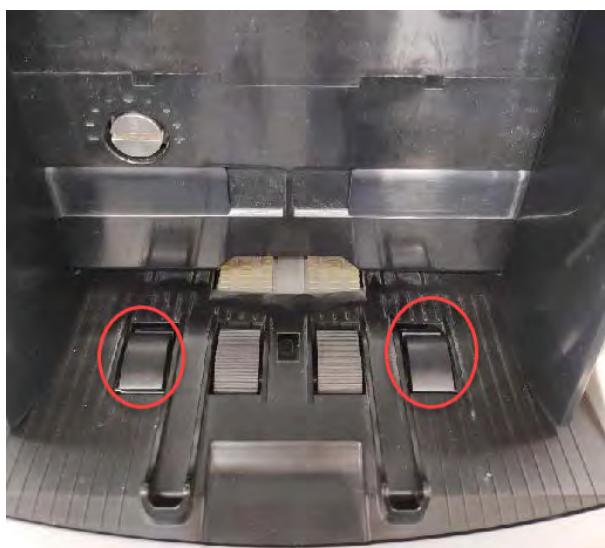
**Important!**

Retain the feed roller to be used with rubber friction element, if required.



5

- [3] Remove the outer hopper friction elements.
To remove, pull the friction element from the groove.



- [4] Install the plastic friction element .
To install, place the friction element on the outer hopper wheel and push it with some force. The friction element snap-fits on the groove.
- [5] Process banknotes to check if the BPS C5 is functioning as desired.

**Important!**

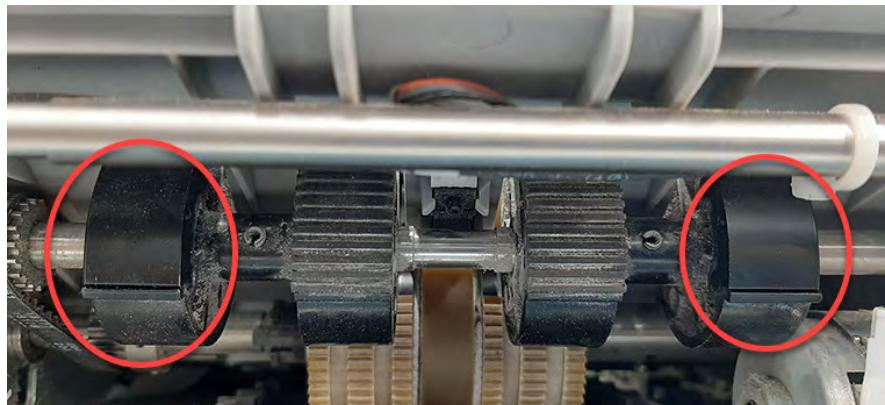
If the desired result is not achieved because of any specific property of the banknotes, then revert to the rubber friction element) .

→ "Installing the Rubber Friction Element", p. 84

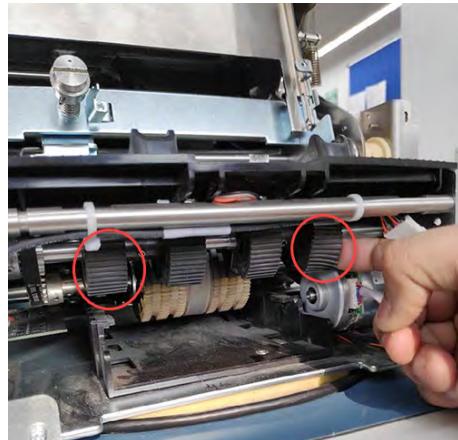
- [6] Install the feeder plate.

Installing the Rubber Friction Element

- [1] Remove the singler cover.
→ *Section 3.8.1.8 "Removing the Singler Cover", p. 44*
- [2] Remove the base cover.
→ *Section 3.8.1.3 "Removing the Front Base Cover", p. 34*
→ *BPS C5 Service Manual*



- [3] Remove the plastic friction elements.
To remove, reach for the hopper wheels assembly under the Guide Plate 1. Then slide the plastic friction elements out of the respective grooves.
- [4] Install the rubber friction elements (509794001).
To install, follow → p. 83



- [5] Install the feed roller.
- [6] Install the feeder plate.
- [7] Install the base cover and the singler cover.

5

5.2.11 Installing Banknote Restrictor

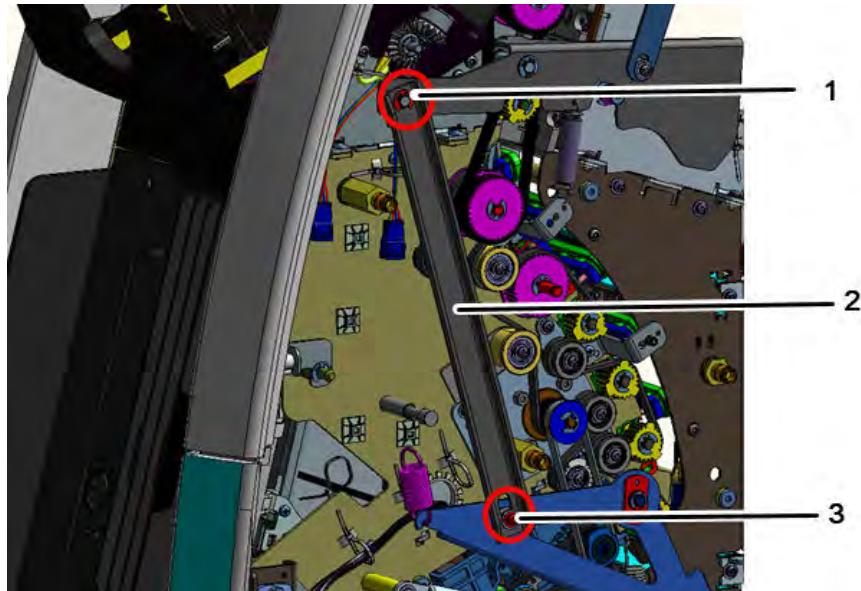
The banknote cover restrictor is installed to prevent the banknotes from falling under the singler.

Requirements

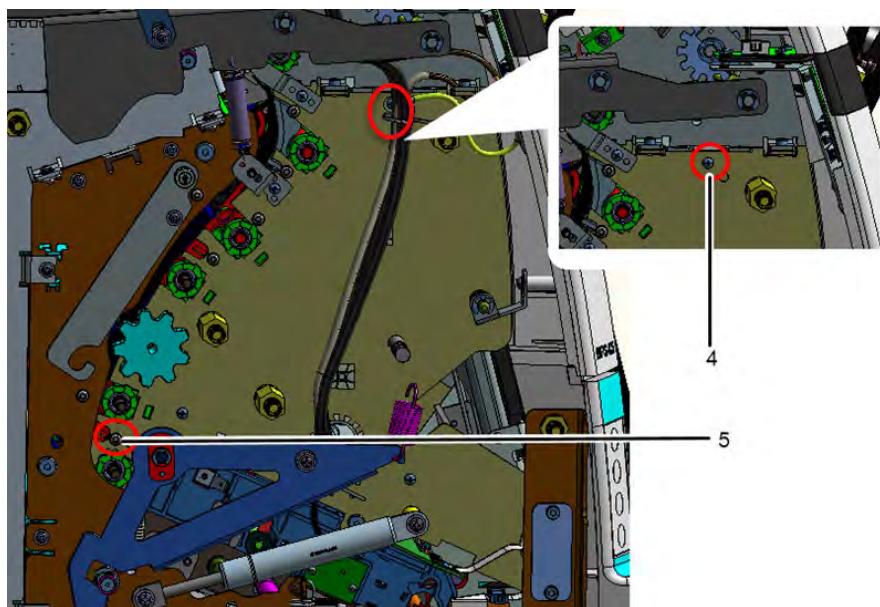
- The BPS C5 switched off
Secure the BPS C5 so that it can not be switched on again.
- The singler removed
For instruction, refer to the → 6.4.2 *Removing the Singler Module* section of the → *BPS C5 Service Manual*.
- The input module front cover removed
- The power supply cover removed
For details, refer to the → 6.3.1 *Input Module Covers* section of the → *BPS C5 Service Manual*.

Procedure

5



- [1] Detach the latch extension brackets (2) on both sides to access the screws properly.
To detach, remove the circlips (1) and screw (3) on both sides.



- [2] Remove the screws (4, 5).
⇒ Similarly remove the same screws on the LHS.

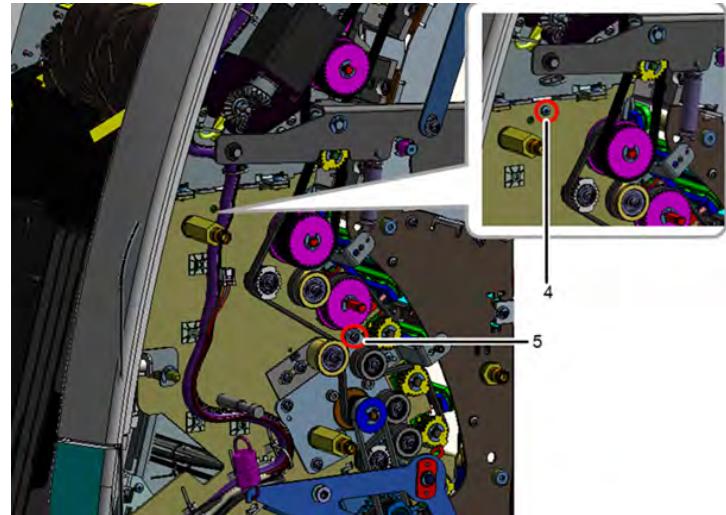


Figure 50: Remove LHS Screws

5

- [3] Place the banknote restrictor in the correct position.

The curvature of the restrictor should face the bottom side as shown in the below image). Match the holes of position 4 first and insert the screw on both sides Then press the restrictor upwards and insert the screws on position 5 both side. Fasten all the four screws.



- [4] Fasten the screws.

⇒ Use the M3 x 12,000 in position 4 and M3 x 10,000 in position 5 as shown in the image below.

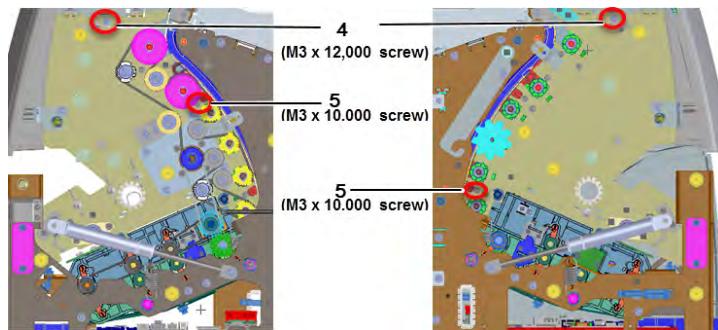


Figure 51: Screws Fastened

Result



The banknote restrictor is installed.

Assemble the BPS C5 before switching it on.

5

**Important!**

After installing the singler and before assembling the BPS C5 covers, check that the input module is opening and closing smoothly

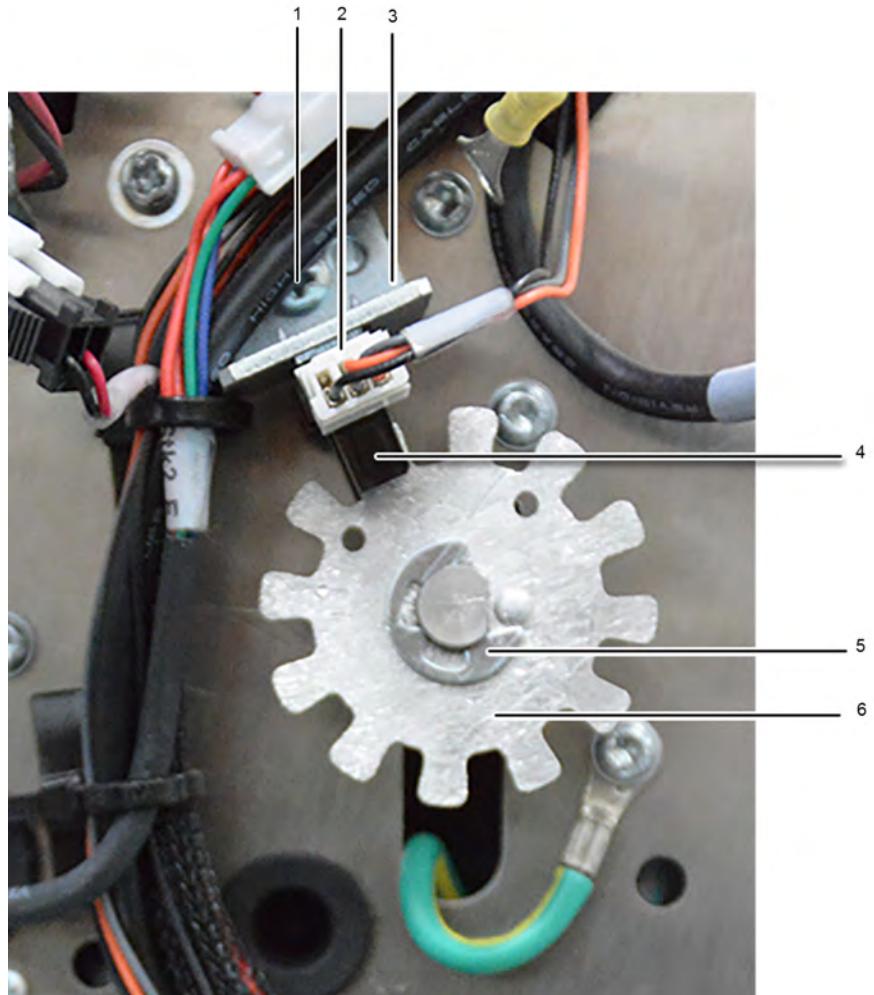
5.3 Replacing Input Stacker Module Parts

5.3.1 Removing the Encoder Disk

Requirements

- The BPS C5 switched off.
Secure the BPS C5 so that it cannot be switched on again.
→ *Section 5.1.1 “Switching BPS C5 On and Off”, p. 63*
- The IM opened
→ *Section 5.1.2.1 “Opening Input Module (IM)”, p. 65*
- Front cover removed
→ *Section 3.8.1.4 “Removing the Front Cover”, p. 36*
→ *BPS C5 Service Manual*

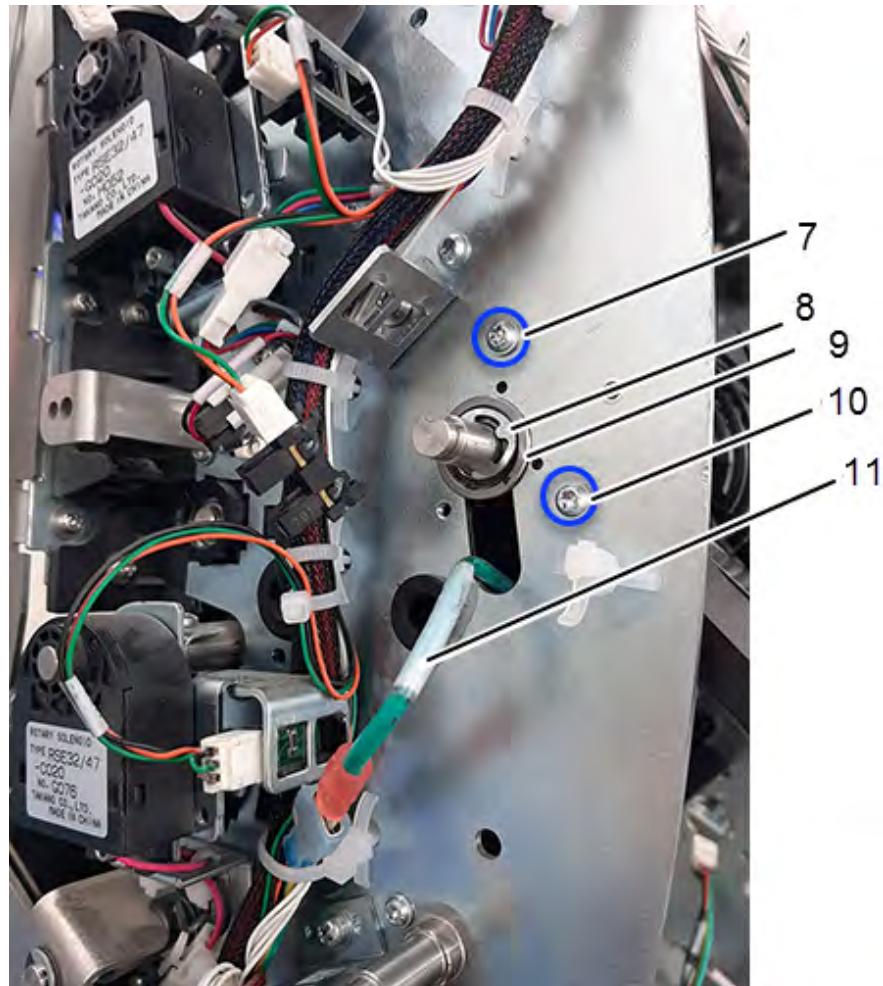
Procedure



5

- [1] Remove the stacker sync encoder PD ((PDSTT1 /2) connector (2)).
- [2] Remove the PD Bracket Screw (1).
- [3] Remove the PD bracket (3)
- [4] Remove the sensor PD (4).
Use the snap lock to remove the PD.
- [5] Remove the retaining washer (5).
- [6] Remove the encoder disk (6).

⇒ The encoder disk is removed. Perform the following additional steps to prepare the BPS C5 for stacker removal.



- [7] Remove the retaining washer and the bearing (8, 9).
- [8] Remove the ground cable (11).
- [9] Remove the screws (7, 10).
- [10] Repeat steps 1 through 9 for stacker 2.

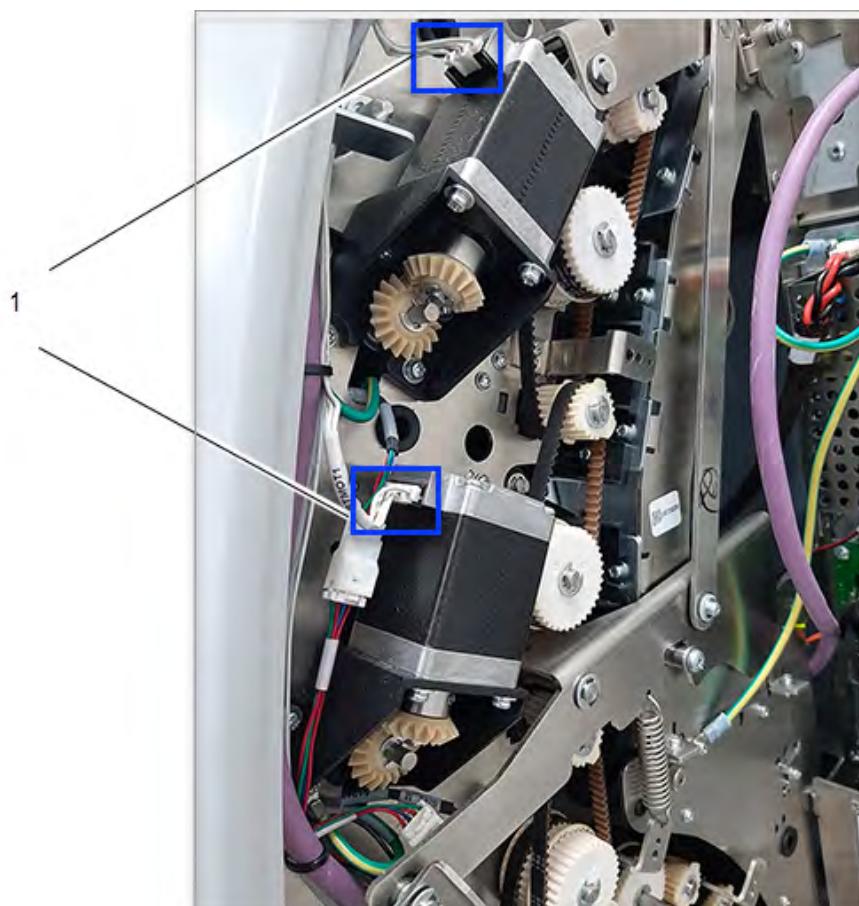
Result

- ⇒ The stacker wheel assembly is ready to be replaced.
→ *Section 5.3.3 “Removing the Stacker Wheel Assembly”, p. 92*

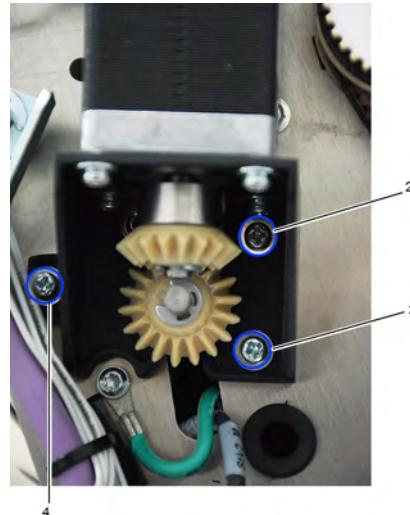
5.3.2 Removing the Stepper Motor

Requirements

- The BPS C5 switched off.
Secure the BPS C5 so that it cannot be switched on again.
→ *Section 5.1.1 “Switching BPS C5 On and Off”, p. 63*
 - The IM opened
→ *Section 5.1.2.1 “Opening Input Module (IM)”, p. 65*
 - Rear cover removed
→ *Section 3.8.1.7 “Removing the Rear Cover”, p. 43*
- *BPS C5 Service Manual*



[1] Disconnect the stepper motor connectors (1).



5

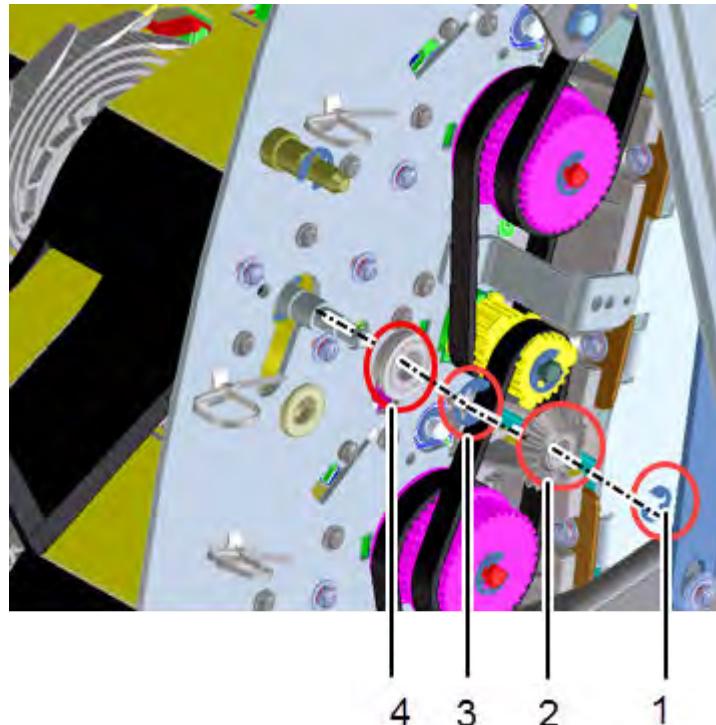
- [2] Remove the screws (2, 3, 4).
- [3] Remove the stepper motor.
- [4] Repeat step 1 through 3 for the other stacker.
- Result ⇒ The stepper motor is removed from both the stackers.

5.3.3 Removing the Stacker Wheel Assembly

Requirements

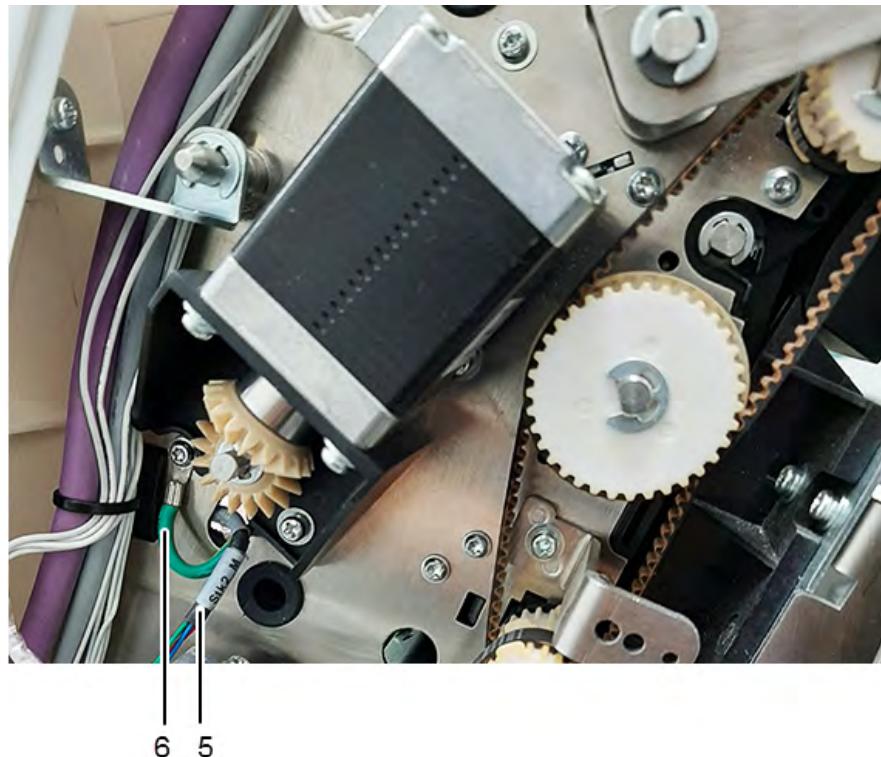
- The BPS C5 switched off.
Secure the BPS C5 so that it cannot be switched on again.
→ *Section 5.1.1 “Switching BPS C5 On and Off”, p. 63*
- The IM opened
→ *Section 5.1.2.1 “Opening Input Module (IM)”, p. 65*
- U Cover removed
- Top cover removed
- Encoder disks removed
→ *Section 5.3.1 “Removing the Encoder Disk”, p. 88*
- Stepper motors removed
→ *Section 5.3.2 “Removing the Stepper Motor”, p. 91*
→ *BPS C5 Service Manual*

Procedure

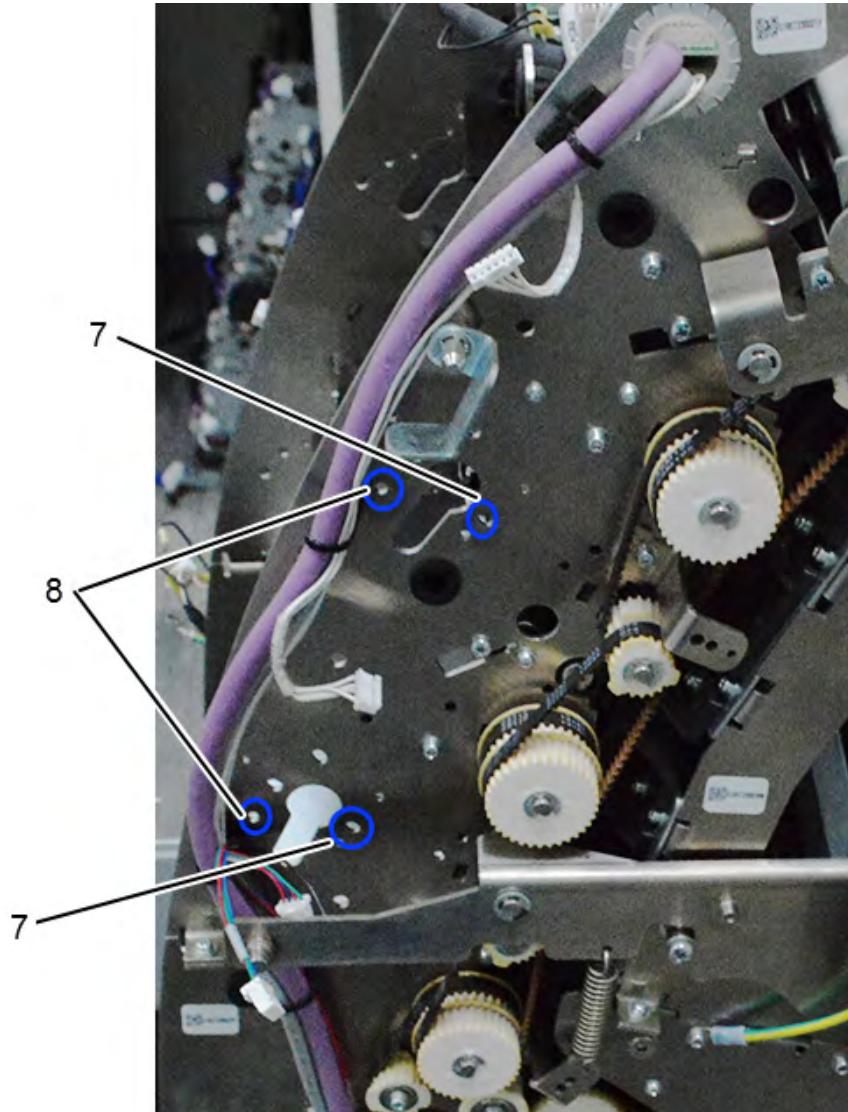


- [1] Remove the retaining washers (1).
- [2] Remove the bevel gears (2).
- [3] Remove the retaining washer and flange ball bearing (3, 4).

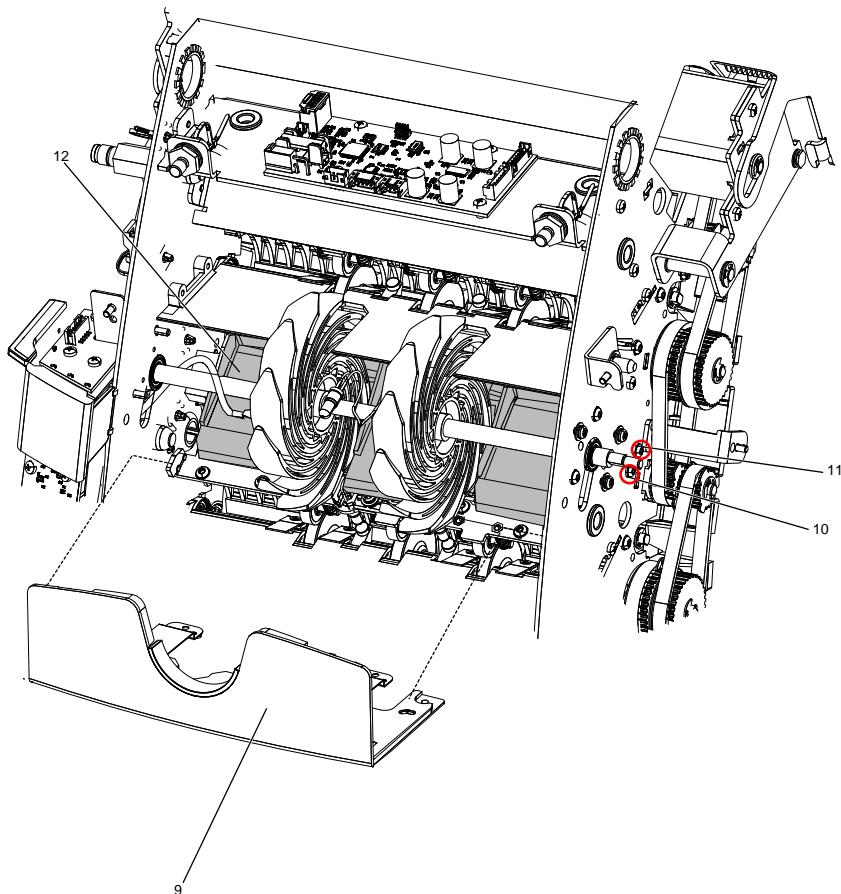
5



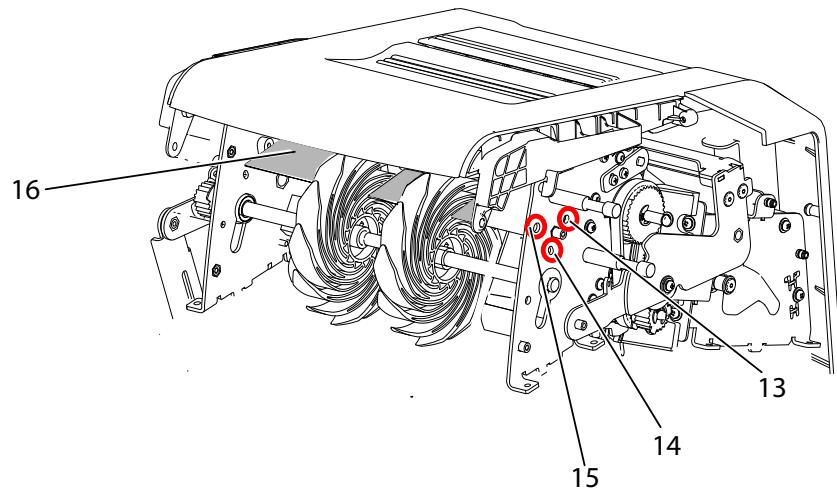
- [4] Remove the STK1_M connector (5).
- [5] Remove the ground cable (6).



[6] Remove the screws (7, 8).

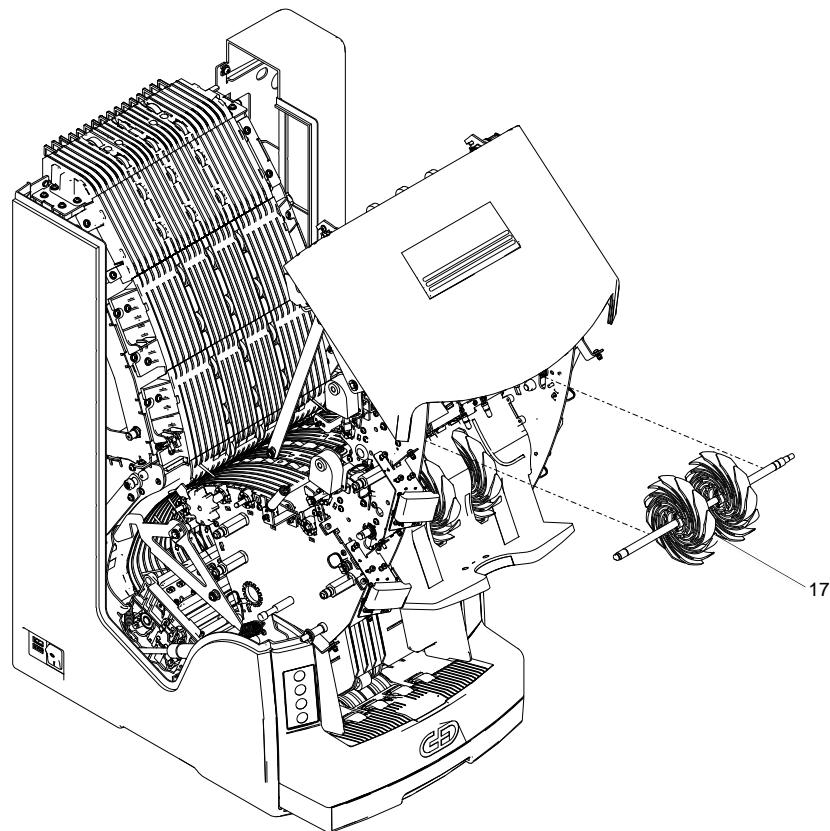


- [7] Remove the stacker 1 collecting plate (9).
- [8] Remove the screws (10, 11) on both sides.
- [9] Remove the cover sheet (12).



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- [10] Remove the screws (13, 14, 15) on both sides.
- [11] Remove the antistatic plate (guide plate 10) (16).



- [12] Remove the stacking wheel assembly (17) .



[13] Remove the retaining washer from the stacker wheel assembly (14).

[14] Repeat steps 1 through 11 for both the stackers.

Result

⇒ The stacker wheel assembly is removed. You can install the retrofit kit.

→ *Section 5.3.4 "Installing the Stacker Wheel Assembly", p. 103*

5.3.3.1 Installing Stacker Cover

The purpose the stacker cover is to prevent high flyers of banknotes in the BPS C5. You are required to install the stacker cover on both the input module stackers.

Requirements

- The BPS C5 switched off

Secure the BPS C5 so that it can not be switched on again.

- The input module front cover and rear cover removed

For details, refer to the → *6.3.1 Input Module Covers* section of the → *BPS C5 Service Manual*.

**Important!**

Each stacker cover consists of two stacker holder with the position label.



Figure 52: Lower Stacker Holders

The stacker holder with label **R** should be installed on RHS. The stacker holder with label **L** should be installed on LHS.

Similarly, the upper stacker holders are labeled **S2-R** and **S2-L** respectively.



Figure 53: Upper Stacker Holders

Do not interchange the stacker holder position!

Procedure

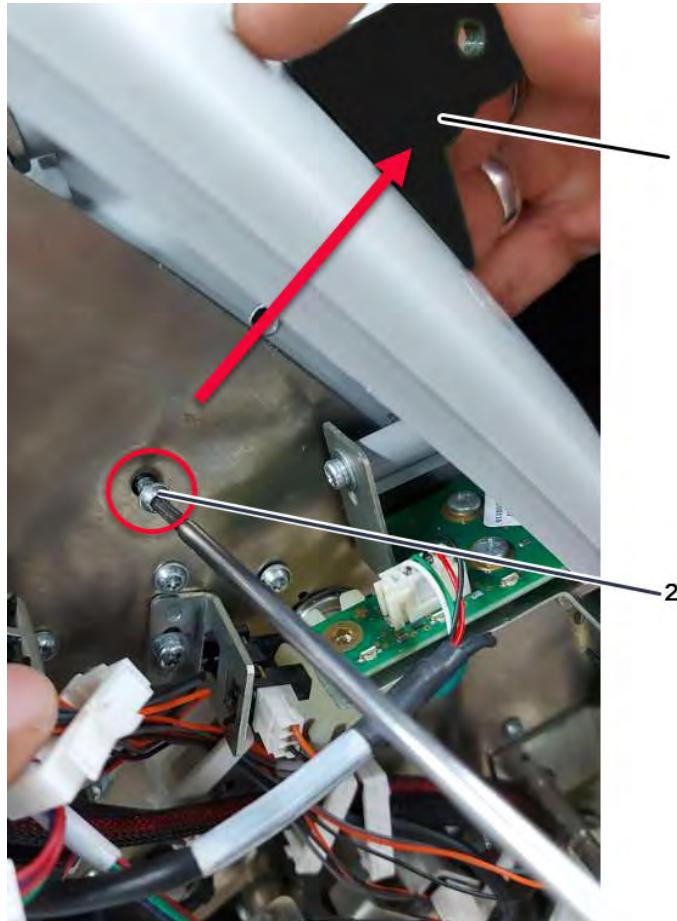


- [1] Place the correct stacker holder in the position as shown in the above image.

The arrow marked position (1) should be placed between enclosure and the holder. The holder should not move up and down, once assembled.

In the example shown in the above image, install the **S2-L** stacker holder.

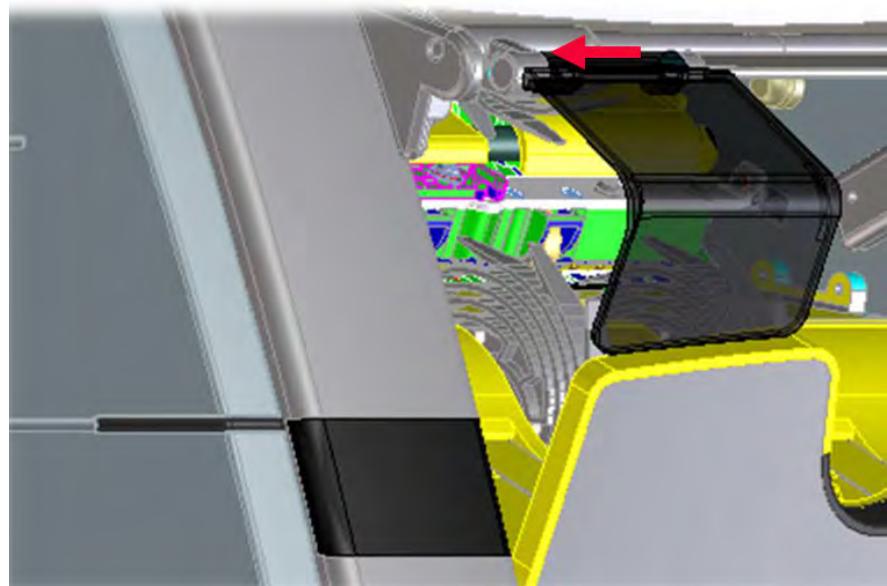
5



- [2] Secure the holder using the M3 x 10,000 screw (2). The screw is provided in the kit.
- [3] Verify the cover holder is in correct position.
To verify, apply pressure on the holder. If the holder slides down, then the screw (2) should be tightened again.
⇒ The stacker holder is attached to the stacker module.
Repeat the above steps for both sides.



Figure 54: Stack holder Installed



[4] 3. Align the stacker cover with the holder .



- [5]** Install the stacker cover.
To install, slide the shaft in the hole on both sides.
⇒ Ensure that the shaft is resting properly on the hole on both sides.



Figure 55: Stacker Cover Installed

- [6]** Repeat step 1 through 4 for both the stackers.
- Result** ⇒ The stacker covers are installed in both the input module stackers.

5.3.4 Installing the Stacker Wheel Assembly

Requirements

- The BPS C5 switched off
Secure the BPS C5 so that it cannot be switched on again.
→ *Section 5.1.1 “Switching BPS C5 On and Off”, p. 63*
- Stacker 1 and 2 assembly wheel removed
- The IM opened
→ *Section 5.1.2.1 “Opening Input Module (IM)”, p. 65*

Procedure

- [1] Install the wave washer on the stacker wheel ball bearing.
Make sure that the wave washer comes between the side frame and bearing flange.
- [2] Install the new stacking wheel assemblies (stacker 1 and 2).
- [3] Install the stacker collecting plates (stacker 1 and 2).
- [4] Install the SS encoder provided in the retrofit kit.



Important!

Ensure that the chamfered edge of the encoder is facing towards the stacker wheel.

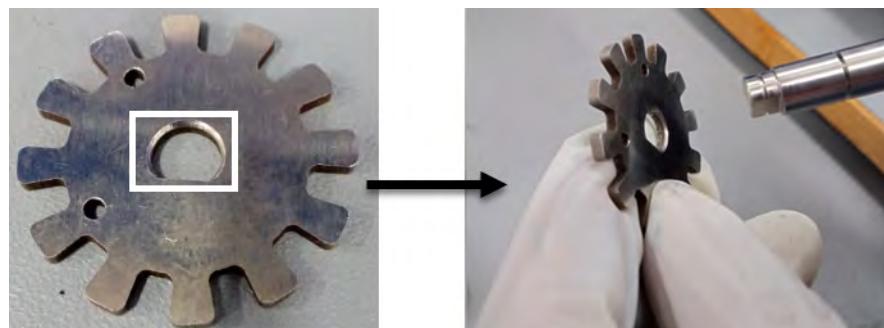


Figure 56: Chamfered Edge of the Encoder

- [5] Install the bevel gears on the stacker 1 and 2 shafts .
Make sure that the bevel gears are properly engaged.
- [6] Install the stepper motors for stacker 1 and 2.

**Important!**

Ensure that there is no play between the two bevel gears against each other.

In case of play:

1. Loosen the three screws (highlighted in the image below).



Figure 57: Bevel Gear

2. Push the stepper motor downwards until there is no play.
3. Tighten the screws.

[7] Install the PD on the PD bracket provided in the retrofit kit.

[8] Install the PD bracket assembly on the side frame.

Do not completely tighten the screw of the PD bracket.
Tighten the screw to an extend that slight motion is possible.

Result

⇒ The stacker wheel assembly kit is installed.

**Important!**

Make sure that there is no lateral motion in the stacker wheel assembly.

You are required to perform stacker synchronization before installing the enclosures.

→ *Section 6.4 “Stacker Synchronization”, p. 185*

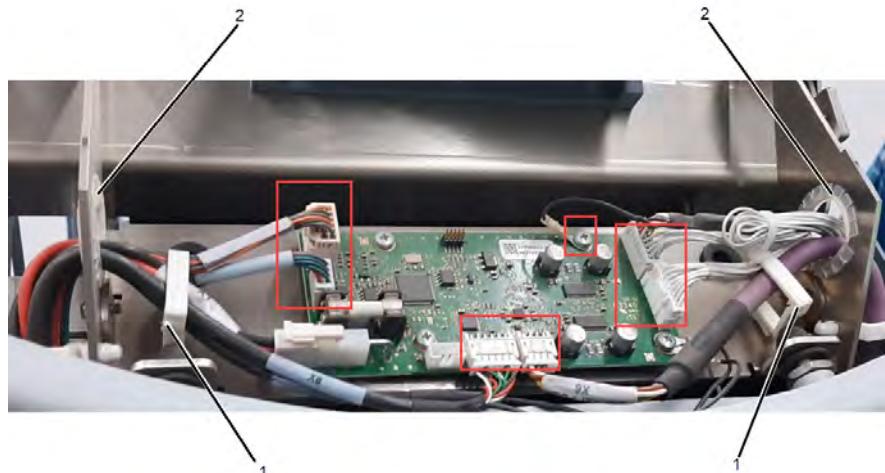
5.3.5 Removing the Input Module Stacker Controller Circuit Board

Requirements

- The BPS C5 is switched Off.
→ *Section 5.1.1 “Switching BPS C5 On and Off”, p. 63*
- Top Cover removed
→ *Section 3.8.1.2 “Removing the Top Cover”, p. 32*
- Unplug the power plug from the power socket and secure the machine/device against being switched back on.
- The BPS C5 is opened.
→ *Section 5.1.2.1 “Opening Input Module (IM)”, p. 65*

Procedure

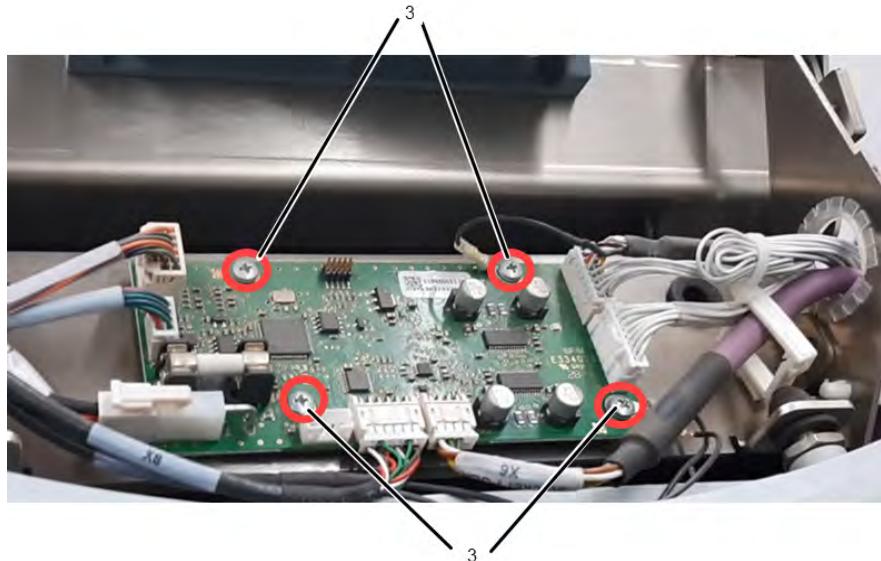
- [1] Disconnect all the connectors (supply, ground, line, neutral connector) from the relay PCB.



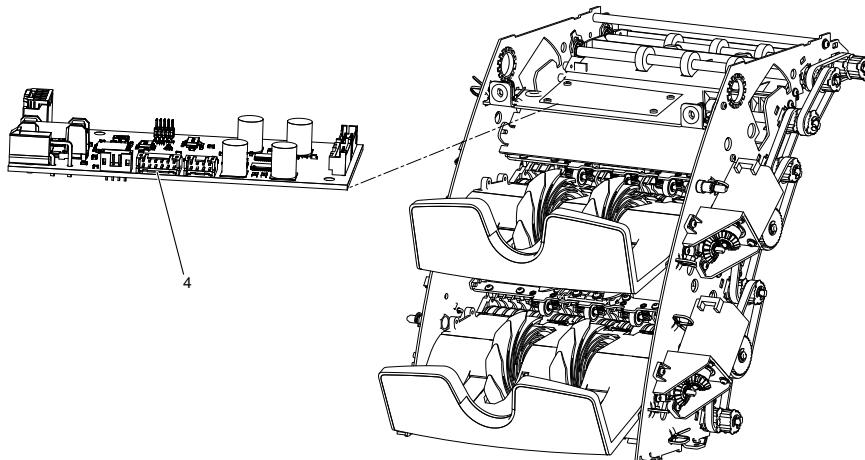
- [2] Open the cable ties (1).

After opening the cable ties, the cables can be removed from the cable route to clear the path (2).

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- [3] Remove the four screws (3) from the board.



- [4] Remove the stacker controller circuit board (4) from the BPS C5.

Result

⇒ The stacker controller circuit board is removed.

5.3.6 Removing the Guide Roller Assembly (3R 16 MM)

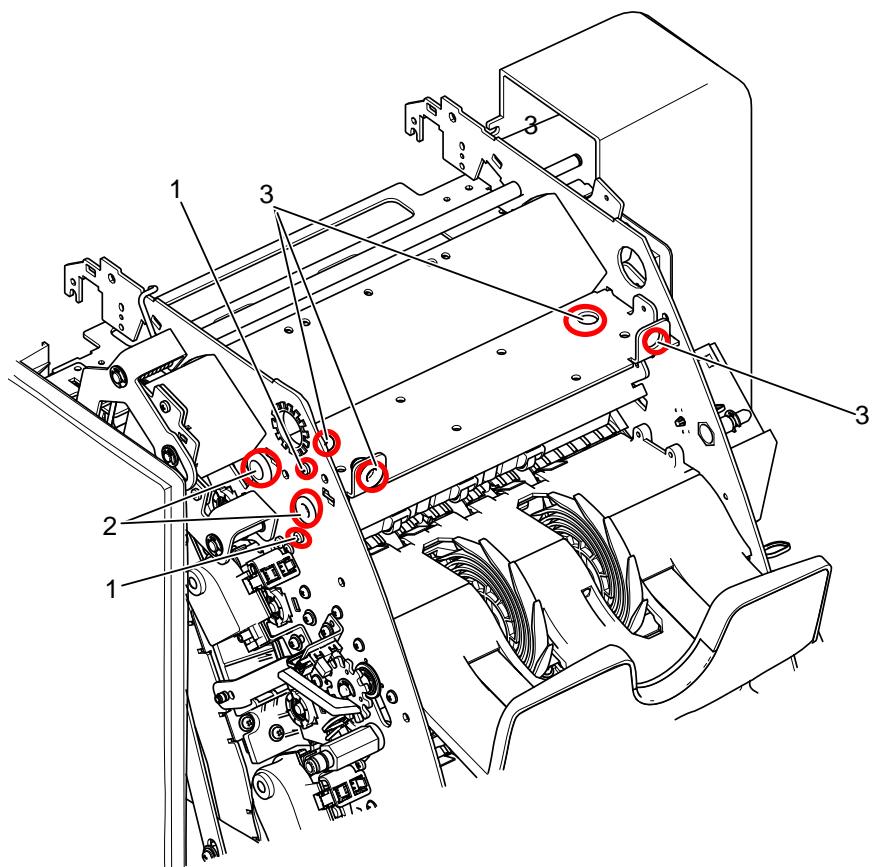
There are two 3R 16 MM guide roller assemblies in stacker module.

Requirements

- The BPS C5 is switched Off.
→ *Section 5.1.1 "Switching BPS C5 On and Off", p. 63*
- Unplug the power plug from the power socket and secure the machine/device against being switched back on.
- The BPS C5 opened
→ *Section 5.1.2.1 "Opening Input Module (IM)", p. 65*
- The top cover removed
→ *Section 3.8.1.2 "Removing the Top Cover", p. 32*
- The front cover removed
→ *Section 3.8.1.4 "Removing the Front Cover", p. 36*
- Stacker controller circuit board removed
→ *Section 5.3.5 "Removing the Input Module Stacker Controller Circuit Board ", p. 105*

5

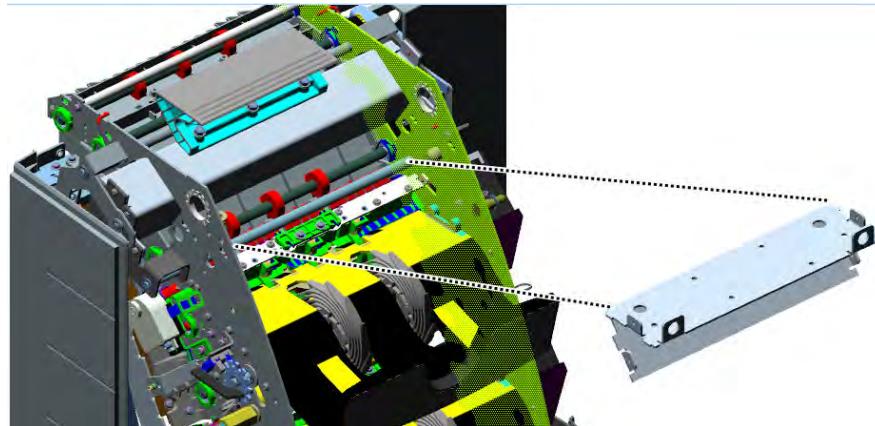
Removing Guide Roller Assembly from Standard Stacker



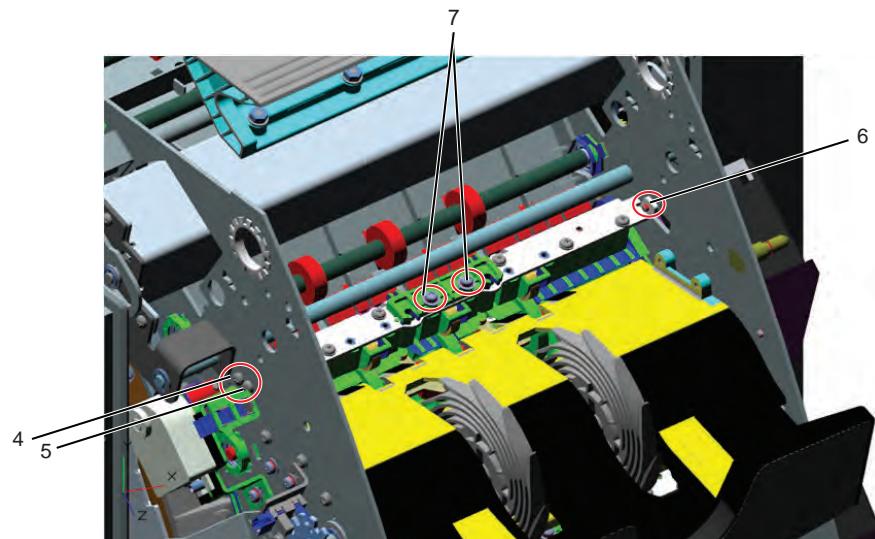
- [1] Remove the screws (1) on both sides.
- [2] Remove the snap locks (2) on both sides.

5

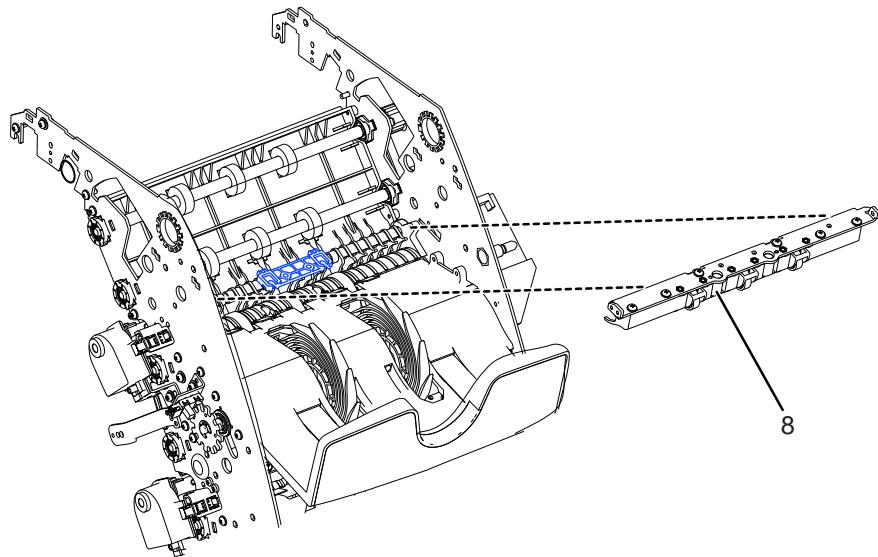
- [3] Remove the snap locks (3) from the stacker control board frame.



- [4] Remove the stacker control board frame.
To remove, slightly lift the frame and pull out.



- [5] Remove the screws (4, 5) on front sides.
[6] Remove the screw (6) on the rear side.
[7] Remove the photodetector screws (7).

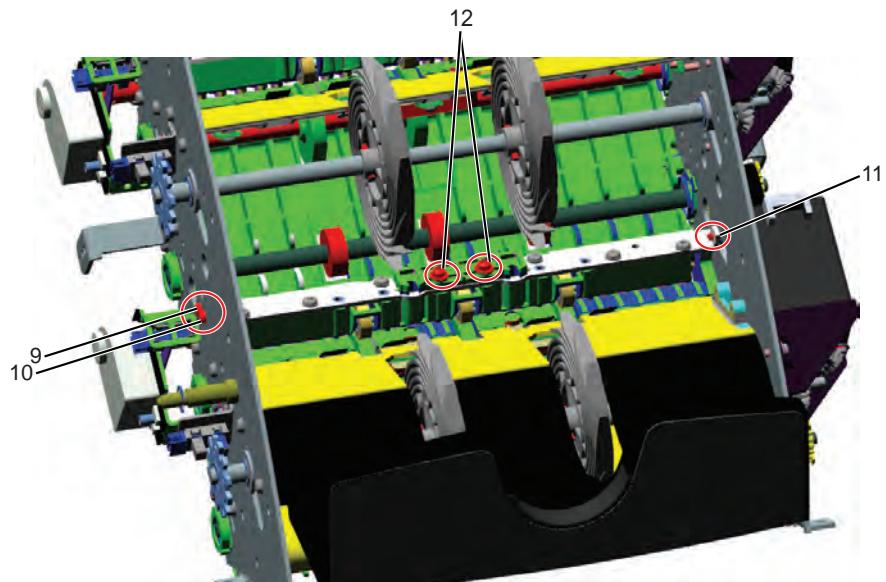


5

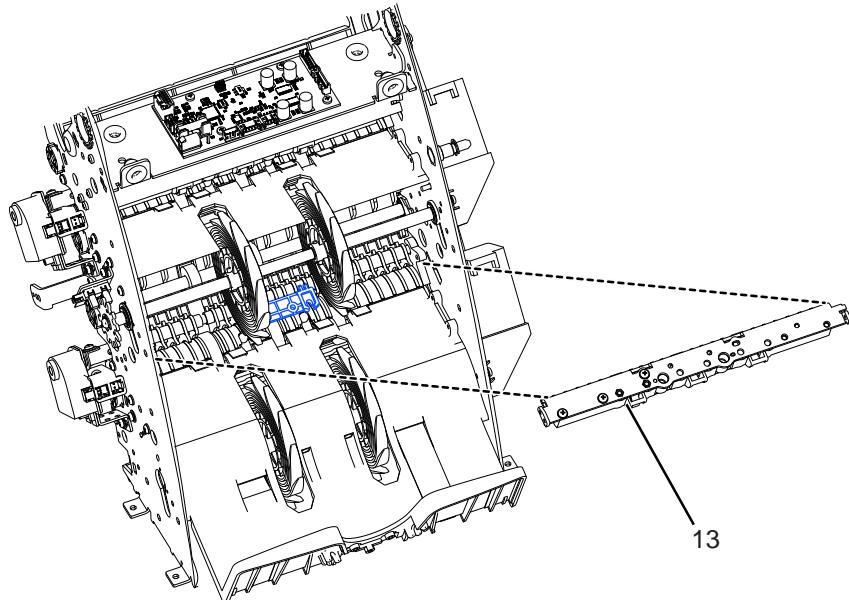
- [8] Slide and remove the 3R 16mm guide roller.

Removing Guide Roller Assembly from Reject Stacker

- [9] Remove the stacker collecting plate and antistatic plate from the standard stacker.
→ *Section 5.3.3 "Removing the Stacker Wheel Assembly", p. 92*
- [10] Loosen the stepper motor screws for better access.
→ *Section 5.3.2 "Removing the Stepper Motor", p. 91*



- [11] Remove the screws (9, 10, 11).
- [12] Remove the photodetector screws (12).



- [13]** Slide and remove the 3R 16mm guide roller assembly (13).

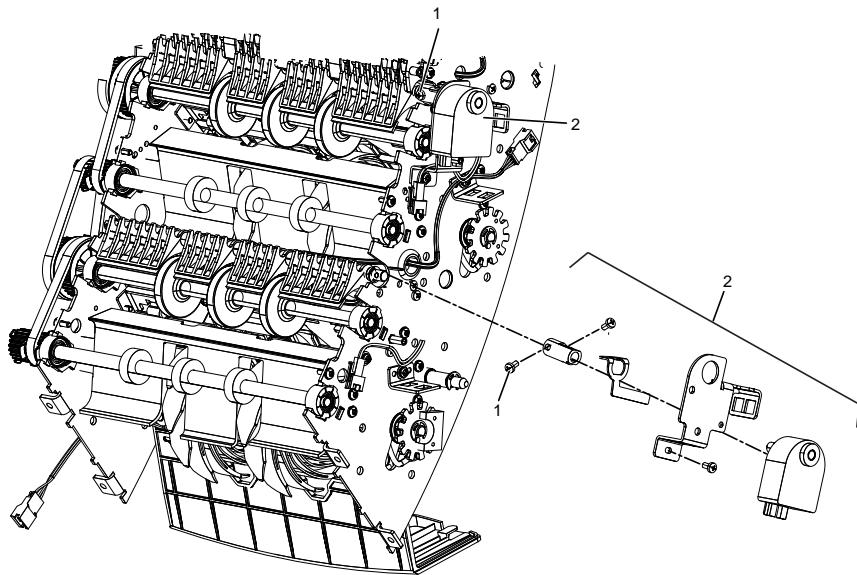
Result ⇒ The guide roller assembly (3R 16 MM) is removed.

5.3.7 Replacing Banknote Diverters in Input Module

Requirements

- The BPS C5 is switched Off.
→ *Section 5.1.1 “Switching BPS C5 On and Off”, p. 63*
- Unplug the power plug from the power socket and secure the machine/device against being switched back on.
- The BPS C5 is opened.
→ *Section 5.1.2.1 “Opening Input Module (IM)”, p. 65*
- Front covers removed
→ *Section 3.8.1.4 “Removing the Front Cover”, p. 36*
- Top covers removed
→ *Section 3.8.1.2 “Removing the Top Cover”, p. 32*
- U cover removed
→ *Section 3.8.1.9 “Removing U Cover”, p. 46*

Procedure



5

[1] Remove the screws (1).

[2] Detach the solenoid (2).

When removing the solenoid, check the following parts for damage:

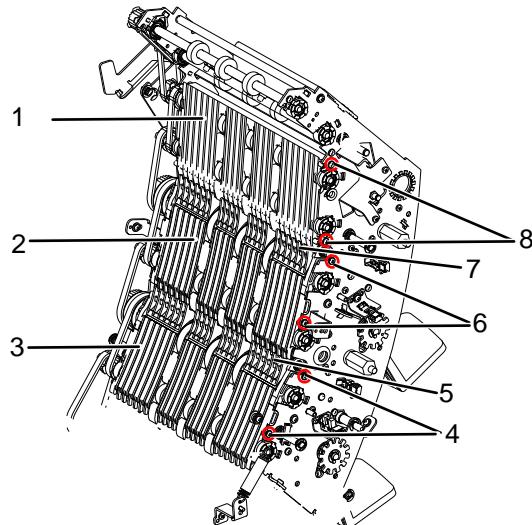
- Solenoid Switch
- Sensor Flag Gate
- Coupler Plug
- Foam Pad Solenoid

Replace any damaged parts.

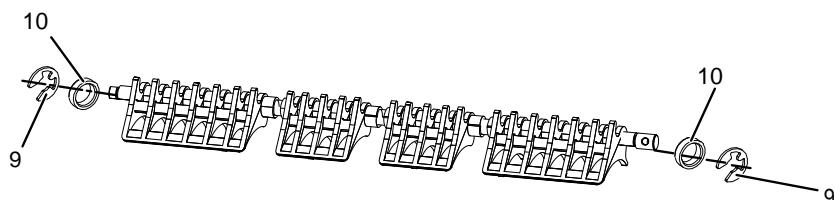
There are two banknote diverters in the BPS C5, one each for:

- Standard Stacker - To remove the standard stacker banknote diverter (7), remove guide plates (1, 2) in sequence.
- Reject stacker - To remove the reject stacker banknote diverter (5), remove all the three guide plates in the sequence 1, 2 and 3.

While installing, install the guide plates in the sequence 3, 2, 1.



- [3] Remove guide plate 1 (1).
To remove the guide plate, remove the screws (8).
- [4] Remove guide plate 2 (2).
To remove the guide plate, remove the screws (6).



- [5] Remove the top banknote diverter (7).
To remove the diverter, remove the circlip and washer (9, 10) on both sides.
- [6] Remove guide plate 3 (3).
To remove the guide plate, remove the screws (4).
- [7] Remove the banknote diverter (5) in the same way as the standard stacker banknote diverter (7).

Result

- ⇒ The banknote diverters are removed.
Ensure that there is no transport gap in any other locations.

**Important!**

While installing, first install the diverters in the guide plates. then install the guide plates in the sequence 3, 2, 1.

Always, start work from guide plate 1, then 2 and then 3 to avoid overlap between guide plates.

5.4 Removing the Power Supply Unit

Requirements

- The power supply cover is removed.
→ *Section 3.8.1.5 "Removing the Power Supply Cover", p. 39*

**NOTICE**

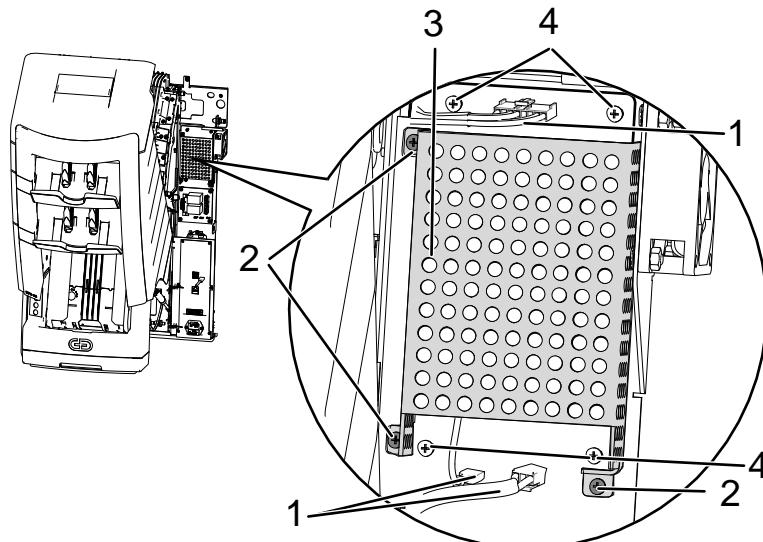
Electrostatic discharge possible

Electronic parts can be damaged.

1. Before starting any maintenance work, switch off the BPS C5.
2. Unplug the power plug from the power socket.
3. Secure the BPS C5 against being switched back on.

5

Procedure



- [1] Disconnect all the connectors (1) (input, output, ground connector) from the power supply unit.
- [2] Remove the screws (2) and then remove the plate (3).
- [3] Remove the four screws (4) from the power supply PCB.
- [4] Remove the power supply unit from the BPS C5.

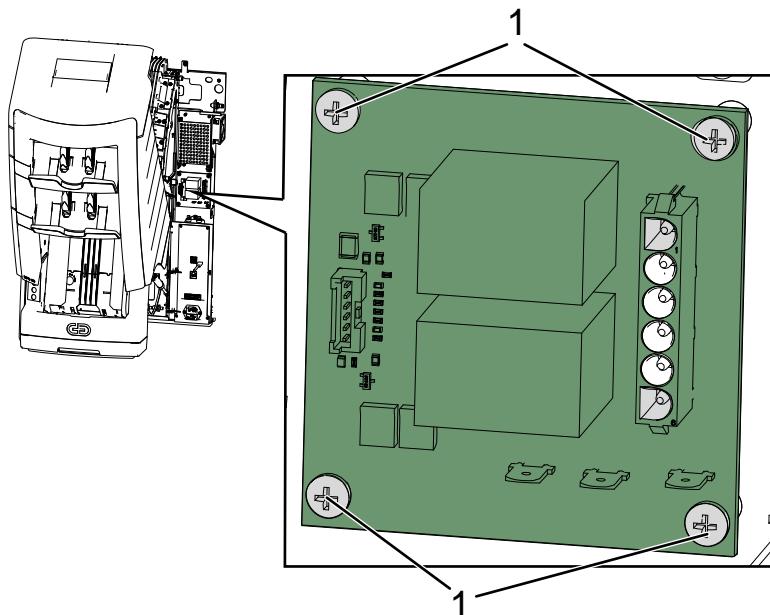
Result ⇒ The power supply unit is removed.

5.5 Removing the Relay PCB

Requirements

- The power supply cover is removed.
→ *Section 3.8.1.5 “Removing the Power Supply Cover”, p. 39*

Procedure



- [1] Disconnect all the connectors (supply, ground, line, neutral connector) from the relay PCB.
- [2] Remove the four screws (1) from the board.
- [3] Remove the relay PCB from the BPS C5.

Result ⇒ The relay PCB is removed.

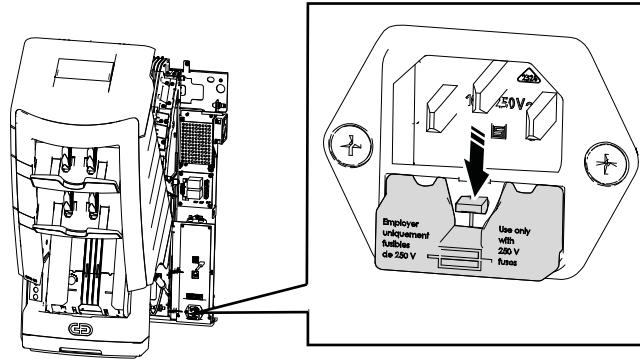
5.6 Removing the Main Fuses

Fuse protection for the main power input is provided by two plugable cartridge fuses of value 10 A each.

Requirements

- The BPS C5 is switched Off.
→ *Section 5.1.1 “Switching BPS C5 On and Off”, p. 63*

Procedure



[1] Press and remove the main fuse holder.

[2] Remove the both fuses from the holder.

Result

⇒ The main fuses are removed

5

5.7 Disconnecting the Input Module

Requirements

- The BPS C5 unpacked
- Installation area setup complete
- The BPS C5 switched off
→ *Section 5.1.1 “Switching BPS C5 On and Off”, p. 63*
Unplug the power plug from the power socket and secure the machine/device against being switched back on.
- SDM rear cover removed
→ *Section 3.8.2.2 “Removing the Rear cover”, p. 50*
- Two people to handle the BPS C5

**NOTICE**

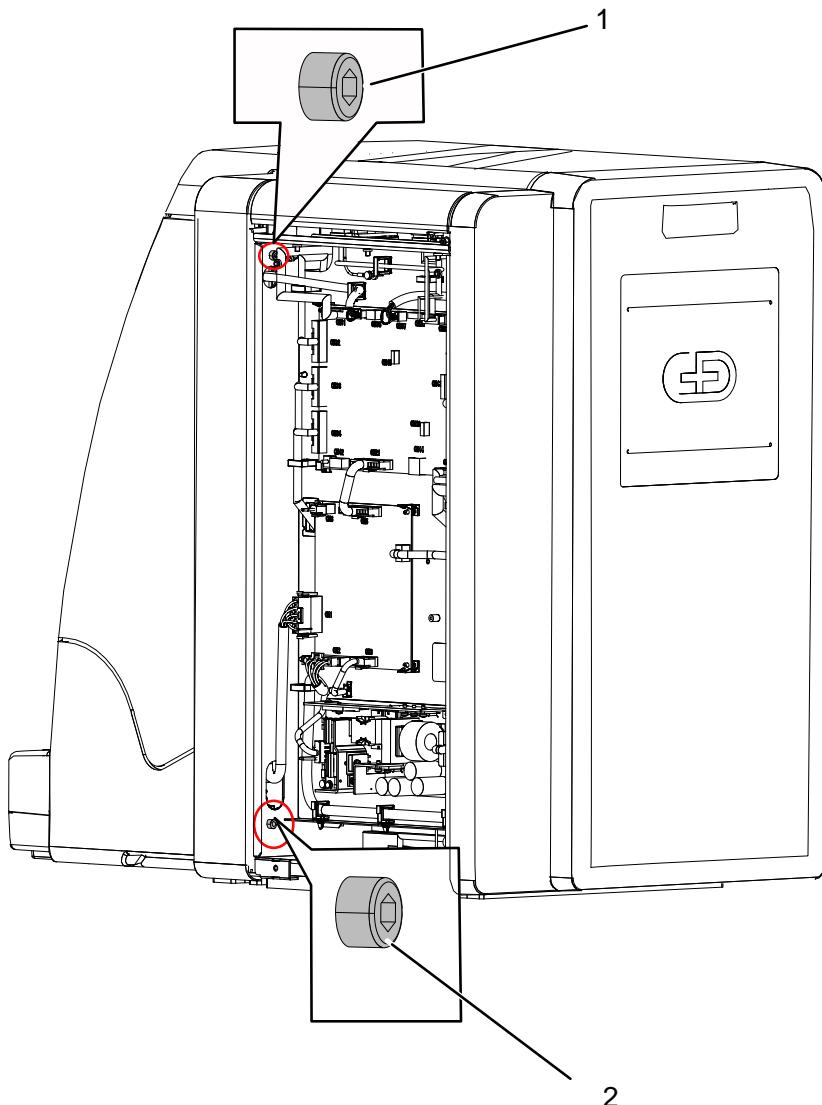
Disconnecting the SDMs from the BPS C5

may result in toppling of the IM

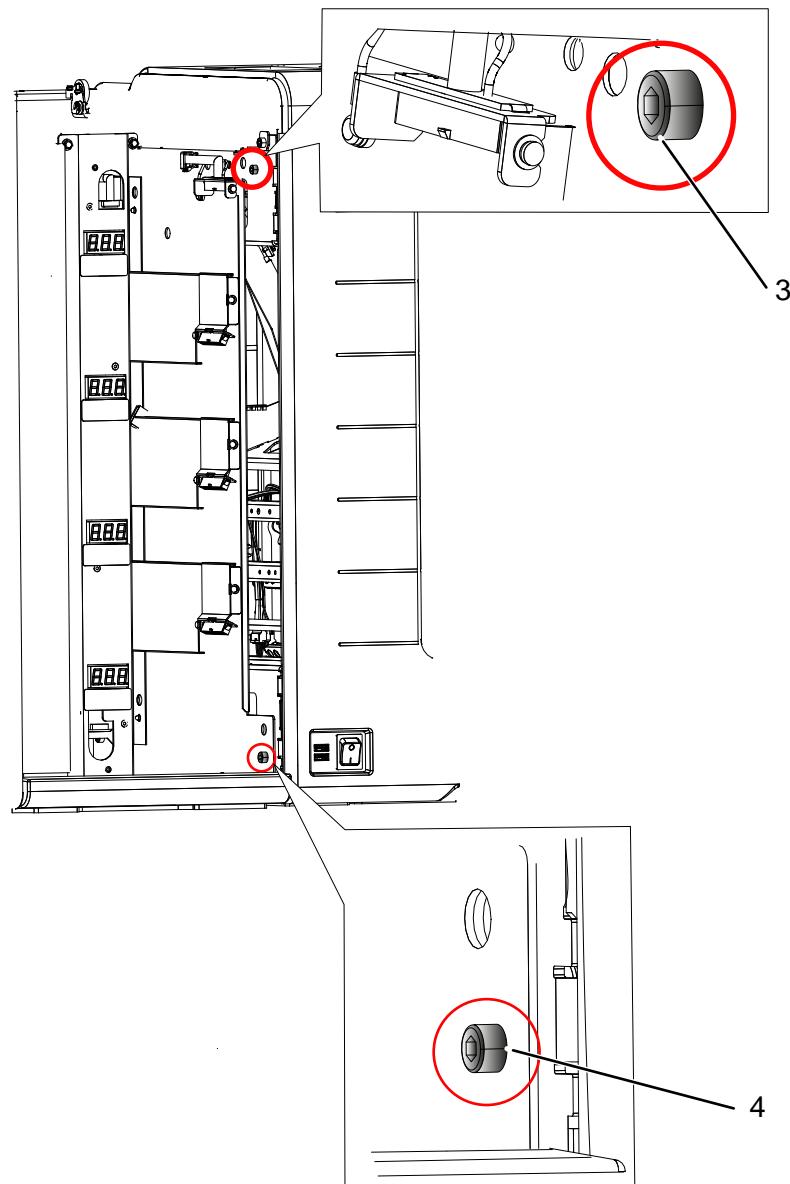
One person must hold the IM when the SDM is removed.

Procedure

5

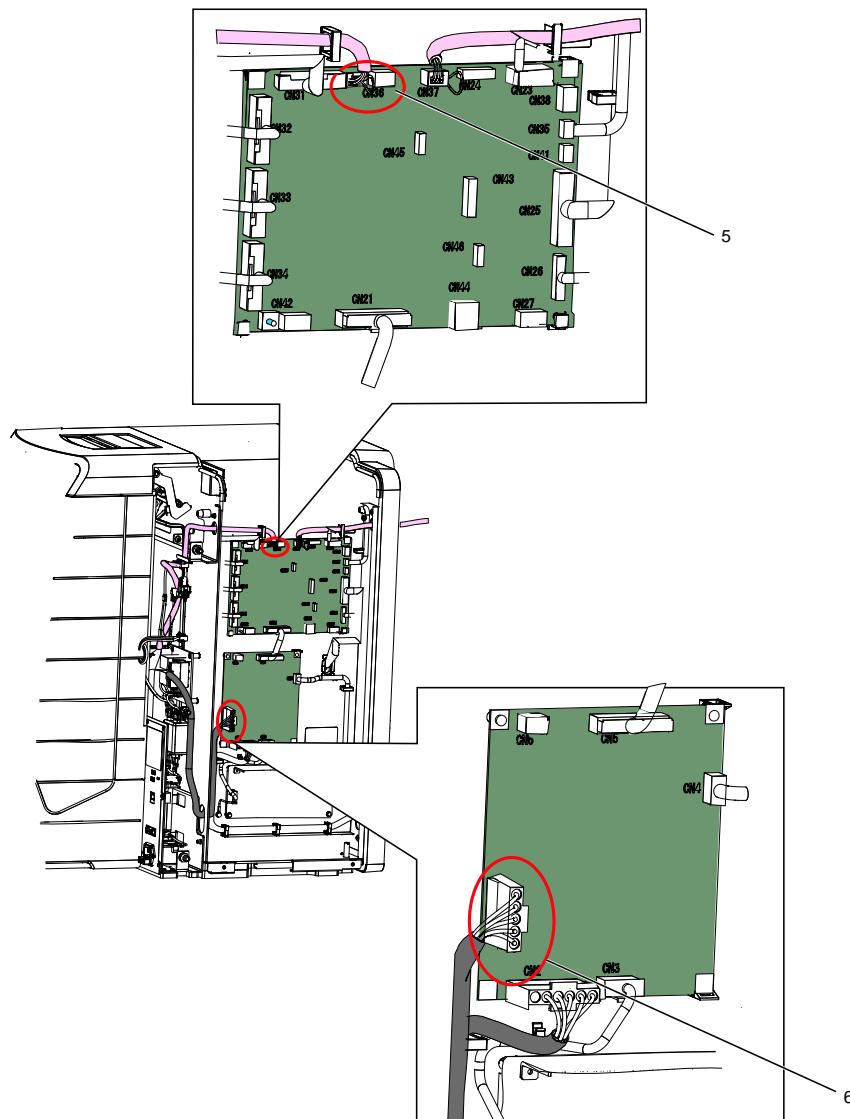


- [1] Remove the screws (1, 2) on the rear side.



[2] Remove the screws from the front (3, 4) .

5



[3] Disconnect the CAN bus connector (5) and power cable connector (6).

[4] Remove the cables from the SDM.

[5] Pull the SDM away from the IM.

Make enough space to attach the additional SDMs.

Result

⇒ The BPS C5 SDM is disconnected from the input module.
You can install the additional SDMs between the input module and the SDM with FSM

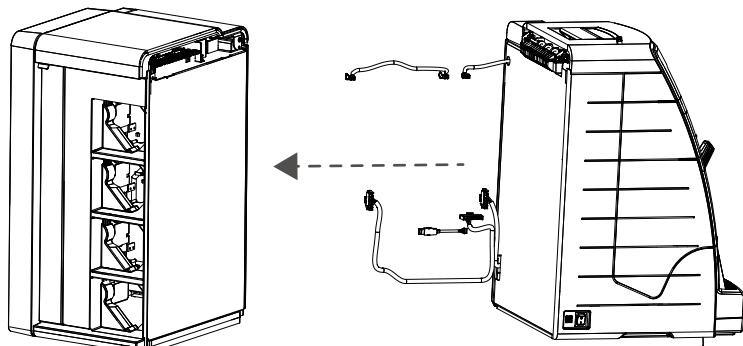


Figure 58: SDM Installation

5.8 Removing the Upper Sensor Housing

Requirements

- The BPS C5 is switched Off.
→ *Section 5.1.1 “Switching BPS C5 On and Off”, p. 63*
- The BPS C5 is opened.
→ *Section 5.1.2 “Opening and Closing BPS C5”, p. 64*
- The front and rear covers are removed.
→ *Section 3.8.1.4 “Removing the Front Cover”, p. 36*
→ *Section 3.8.1.7 “Removing the Rear Cover”, p. 43*

5

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**Important!**

When connecting the flex cables, ensure that the flex cables are connected in the direction as shown in the figure below. In the correct position, blue part of the flex cable should always be visible on the upper side.



Figure 59: Correct Direction of Flex Cables

Always, clean the connectors on the PCB side and flex cable connectors before installing.

Procedure

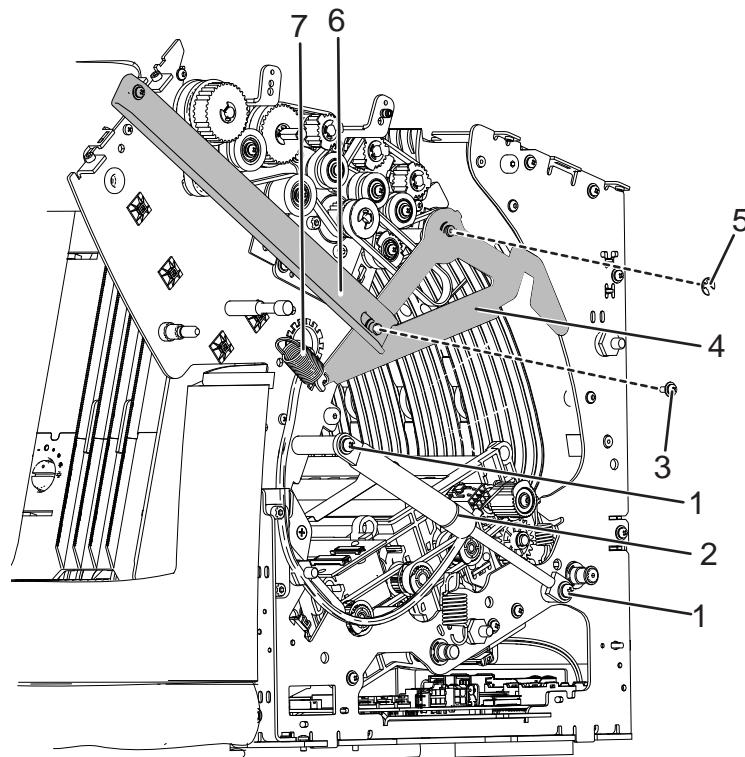
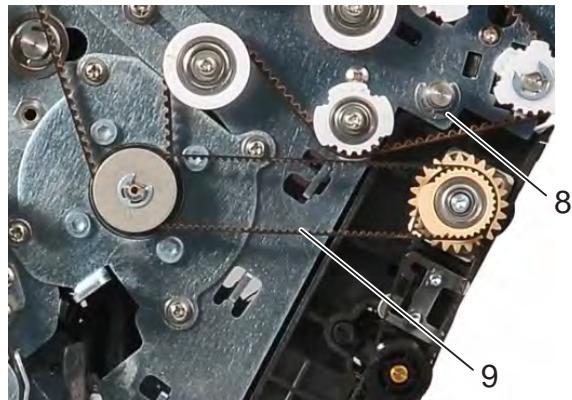
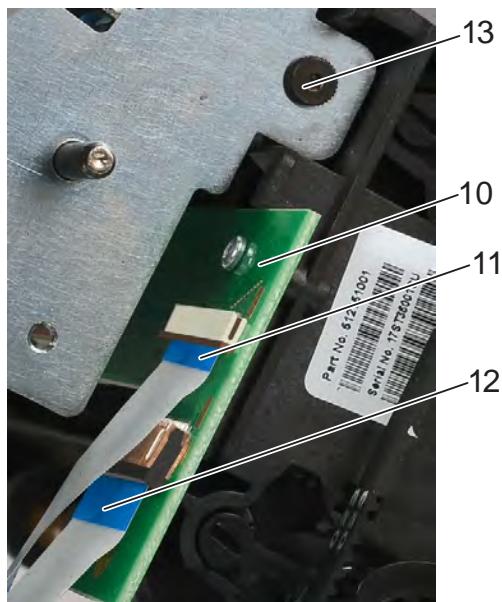


Figure 60: Latch Bracket Removal

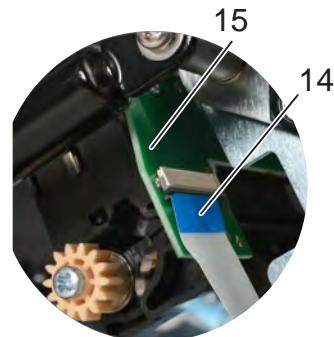
- [1] Remove the screws (1) on both sides.
- [2] Remove the pneumatic spring (2) on both sides
- [3] Remove the torsion springs (7) on both sides.
- [4] Remove the screws (3) on both sides.
- [5] Detach the latch extension brackets (4) on both sides.
- [6] Remove the circlips (5) on both sides.
- [7] Remove the lower latch brackets (6) on both sides of the BPS C5.



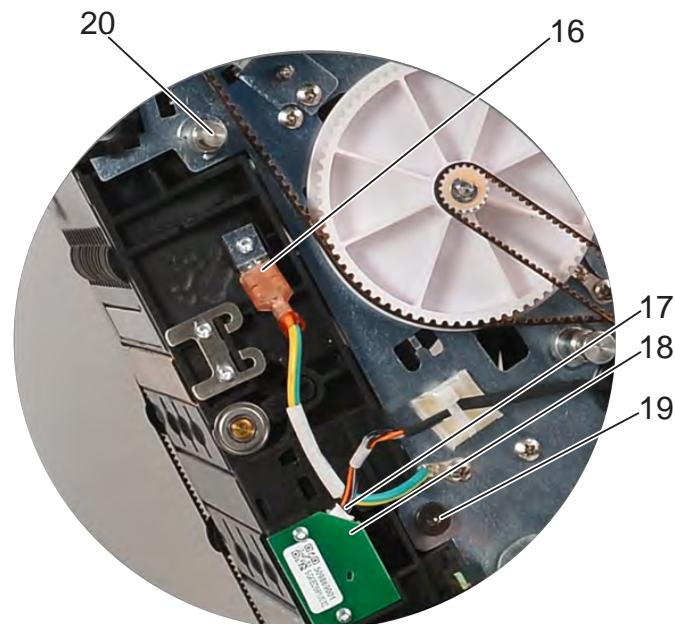
- [8] Remove the circlips (8) on both sides.
- [9] Dismount the belt (9) from the spur gear of the sensor housing.



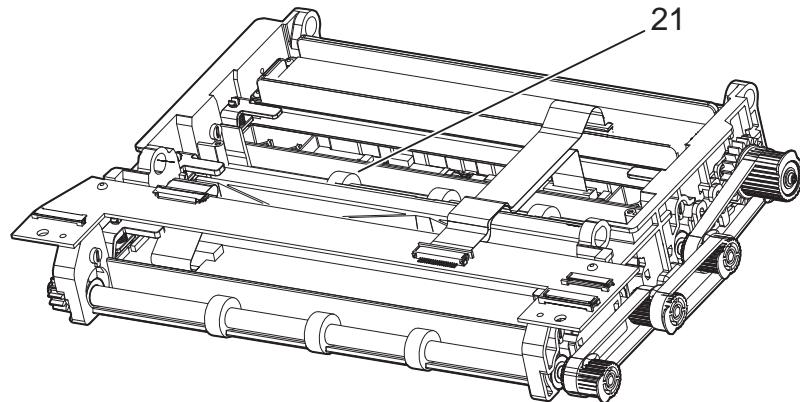
- [10] Gently, unlock and unplug the MAG cable (11) from the connector on the BASB (10).
- [11] Gently, unlock and unplug and unplug the MTS cable (12) from the connector on the BASB (10).
- [12] Remove the screw (13).



- [13] Gently, unlock and unplug and unplug the PIS cable (14) from the connector on the BASB (15).



- [14] Unplug the ground connector (16).
- [15] Unplug the encoder connector (17) from the encoder assembly (18).
- [16] Remove the screw (19).
- [17] Hold the sensor housing assembly (21) with one hand and remove the shaft (20).



[18] Remove the sensor housing (21) from the BPS C5.

Result ⇒ The upper sensor housing is removed.

5

5.8.1 Removing the Mechanical Thickness Sensor (MTS)

Requirements • The upper sensor housing removed.
→ *Section 5.8 “Removing the Upper Sensor Housing”, p. 119*

Procedure

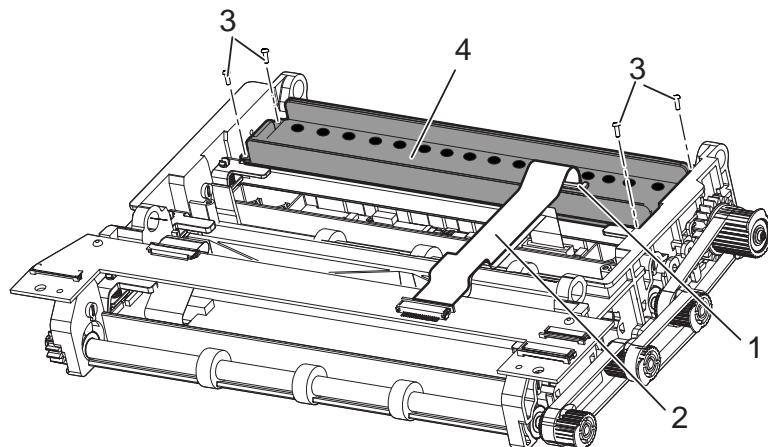


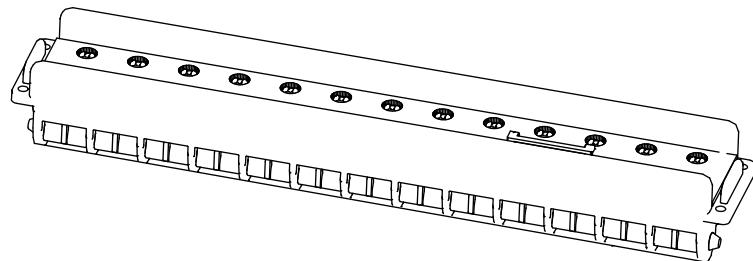
Figure 61: Mechanical Thickness Sensor (MTS) Removal

- [1] Gently, unlock (1) and unplug the cable (2) from the connector.
- [2] Remove the screws (3) on both sides.
- [3] Remove the Mechanical Thickness Sensor MTS (4) assembly from the upper sensor housing.

Result



The MTS is removed.



5.8.2 Removing Magnetic Sensor

Requirements

- The upper sensor housing assembly removed.
→ *Section 5.8 “Removing the Upper Sensor Housing”, p. 119*

Procedure

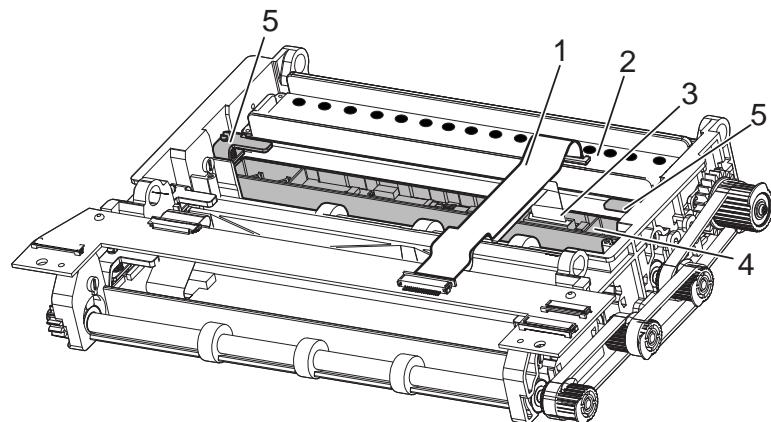


Figure 62: Magnetic Sensor Removal

- [1] Gently, unlock and unplug the MTS Cable (1) from the MTS sensor (2) connector .
- [2] Gently, unlock and unplug the magnetic sensor cable (3) from the MAG (4) connector.

**Important!**

Press down and move the locking latch (5) sideways till it is removed from its position.

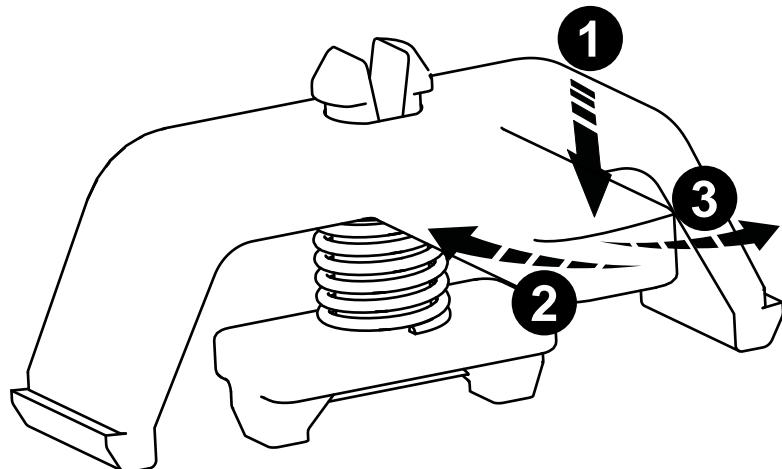
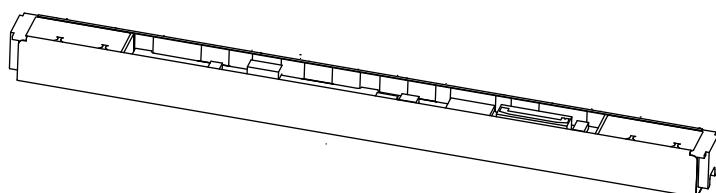


Figure 63: Lock Latch Removal

- [3] Remove the locking latches (5) on both sides.
- [4] Remove the MAG sensor (4) from the upper sensor housing.

Result

⇒ The MAG sensor is removed.



5.8.3 Removing the Encoder Assembly

Requirements

- The upper sensor housing assembly removed.
→ *Section 5.8 “Removing the Upper Sensor Housing”, p. 119*

Procedure

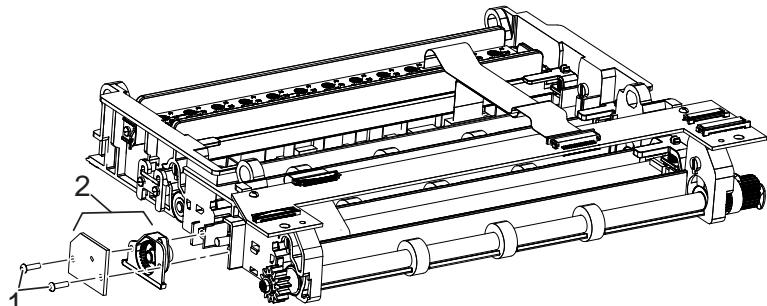


Figure 64: Encoder Removal

- [1] Remove the screws (1).
- [2] Remove the encoder assembly (2) from the sensor drive roller shaft.

Result

⇒ The encoder assembly is removed.

5

5.8.4 Removing the Drive Rollers assembly

Recommended to replace all the drive rollers assemblies together.

Requirements

- The upper sensor housing assembly removed.
→ *Section 5.8 “Removing the Upper Sensor Housing”, p. 119*
- For the drive roller assembly (5) removal, first, the encoder assembly is removed.
→ *Section 5.8.3 “Removing the Encoder Assembly”, p. 126*

Procedure

5

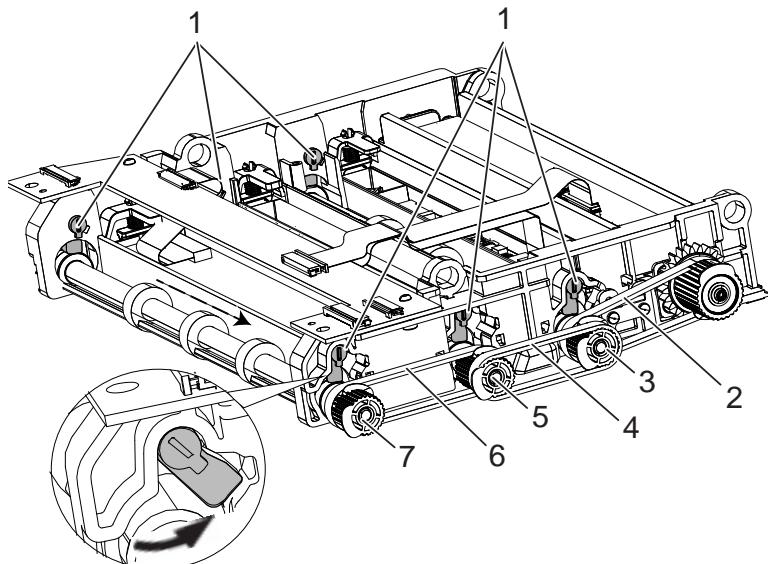
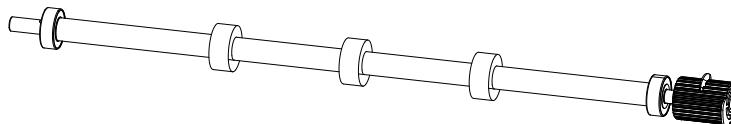


Figure 65: Drive Rollers Assembly Removal

- [1] Remove the belt (4).
- [2] Remove the belts (2, 6).
- [3] Turn the respective lock bearings (1) on both sides in anti-clock wise direction to unlock.
- [4] Slide and remove the drive roller assemblies (3, 5, 7) from the upper sensor housing assembly.

Result

- ⇒ The drive roller assemblies (3, 5, 7) are removed.



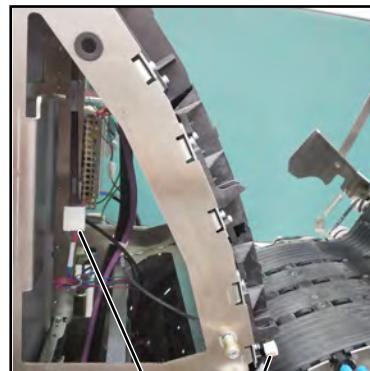
5.9 Removing the Input Coupling Module (ICM)

Requirements

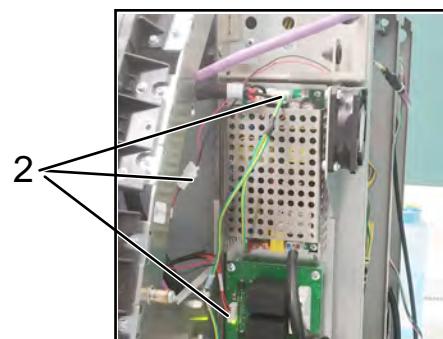
- The BPS C5 is switched Off
→ *Section 5.1.1 “Switching BPS C5 On and Off”, p. 63*
- The power chord and peripheral connectors are removed.
- The SDM is removed
→ *Section 5.7 “Disconnecting the Input Module ”, p. 115*
- The front and rear base covers are removed
→ *Section 3.8.1.3 “Removing the Front Base Cover”, p. 34*
→ *Section 3.8.1.6 “Removing the Rear Base Cover”, p. 41*

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Procedure



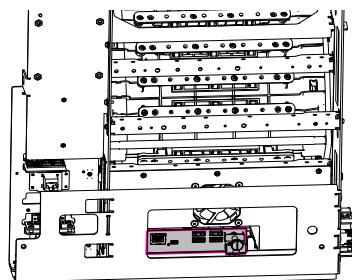
Front



2

Rear

- [1] Disconnect the machine Open/Close and Exit PD connectors (1) from the BPS C5.
- [2] Disconnect the signal relay, power and external fan connector (2) from the BPS C5.

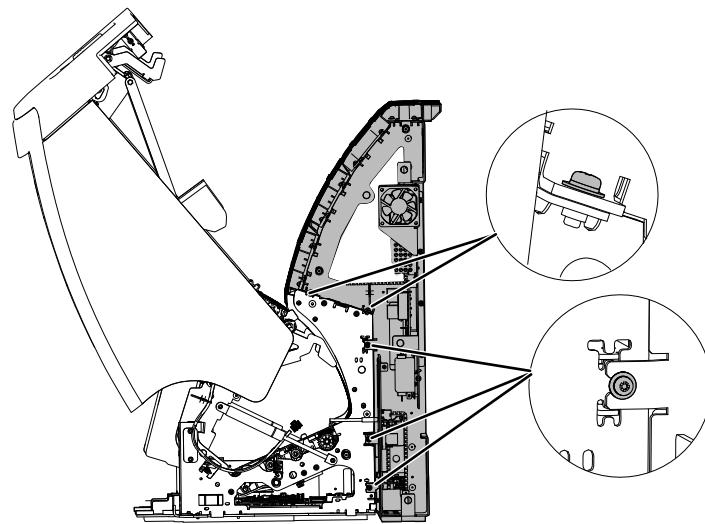


- [3] Remove all the USB's (4 No), mini USB, LAN and GUI cables from rear of the PCB Main.

**NOTICE**

Disconnection the Input Coupling Module (ICM) from the BPS C5 may result in toppling of the Input Base Module (IBM)
One person must hold the IM when the Input Coupling Module (ICM) is removed.

- [4]** Remove the CAN bus cable from the Input Coupling Module (ICM) slot.



- [5]** Remove the screws on both sides.
[6] Remove the Input Coupling Module (ICM) from the Input Base Module (IBM).
- Result** ⇒ The Input Coupling Module (ICM) is removed from Input Base Module (IBM).

5.10 Removing the Lower Sensor Housing

Requirements

- The ICM is removed.
→ *Section 5.9 “Removing the Input Coupling Module (ICM)”, p. 128*

- Pneumatic springs removed
→ *Section 5.8 “Removing the Upper Sensor Housing”, p. 119*

**Important!**

When connecting the flex cables, ensure that the flex cables are connected in the direction as shown in the figure below. When connecting the flex cables, ensure that the flex cables are connected in the direction as shown in the figure below. In the correct position, blue part of the flex cable should always be visible on the upper side.



Figure 66: Correct Direction of Flex Cables

Always, clean the connectors on the PCB side and flex cable connectors before installing.

5

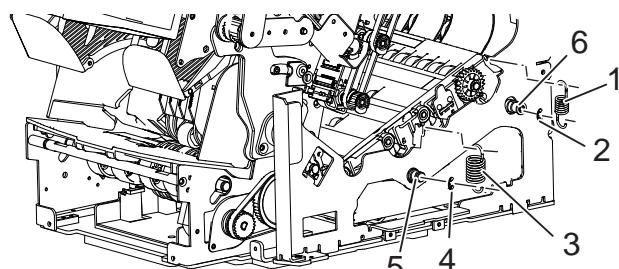
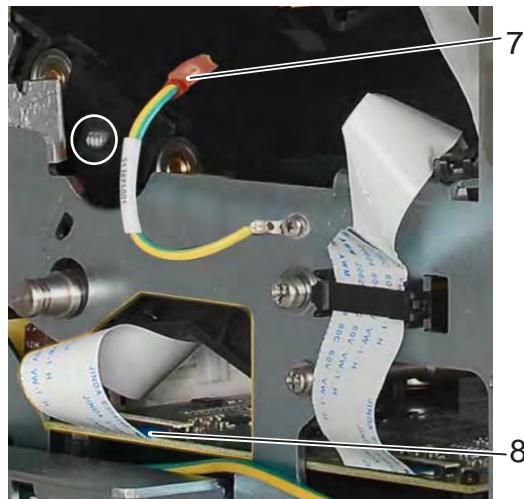
Procedure

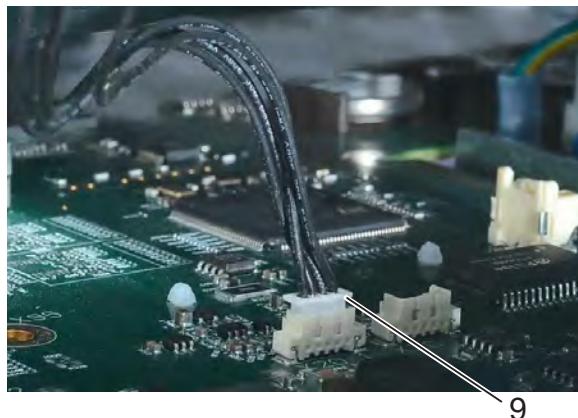
Figure 67: Torsion Spring Removal

- [1] Remove the torsion springs (1) on both sides.
- [2] Remove the circlips (2) on both sides.
- [3] Remove the torsion springs (3) on both sides.
- [4] Remove the circlips (4) on both sides.



5

- [5] Unplug the ground connector (7).
- [6] Gently, unlock and unplug the PIS 1 cable (8) from the connector on the PCB Main.



- [7] On the rear side, unplug the UV cable connector (9) from the PCB Main.
- [8] Remove the shafts (5) and (6).

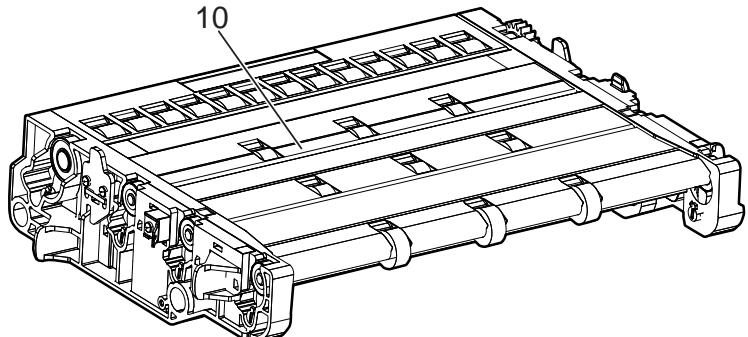


Figure 68: Lower Sensor Housing Removal



Important!

Pay attention to PIS and UV cables for damage, while removing the sensor housing.

5

- [9] Remove the lower sensor housing (10) out of the BPS C5.

Result

- ⇒ The lower sensor housing is removed.

5.10.1 Removing the UV sensor

Requirements

- The lower sensor housing removed.
→ *Section 5.10 “Removing the Lower Sensor Housing”, p. 130*

Procedure

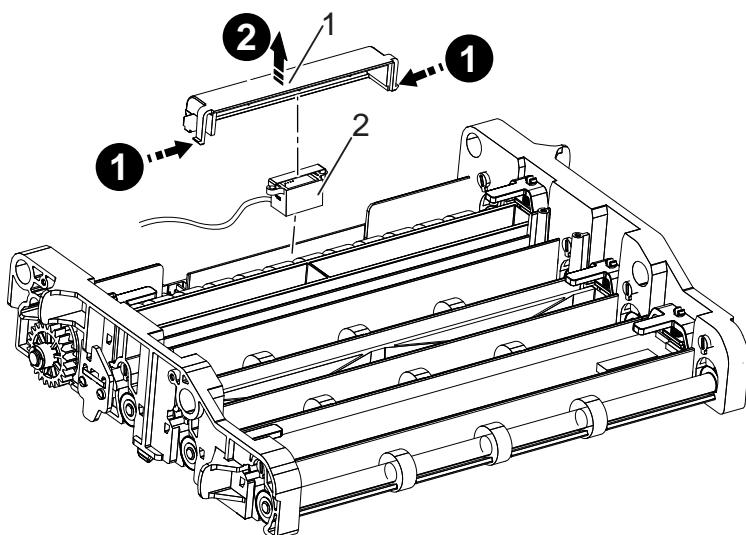


Figure 69: UV Sensor Removal

- [1] Hold, press the locks (on both sides) and remove the cover (1).

- [2] Remove the UV sensor (2) along with the cable from the lower sensor housing (3).

Result ⇒ The UV sensor is removed.

5.10.2 Removing the Transport Rollers

There are three transport roller and one MTS roller assembly in the lower sensor housing. Follow the same removal procedure for all roller assemblies.

Recommended to replace all roller assemblies together.

- Requirements
- The lower sensor housing removed.
→ *Section 5.10 “Removing the Lower Sensor Housing”, p. 130*

Procedure

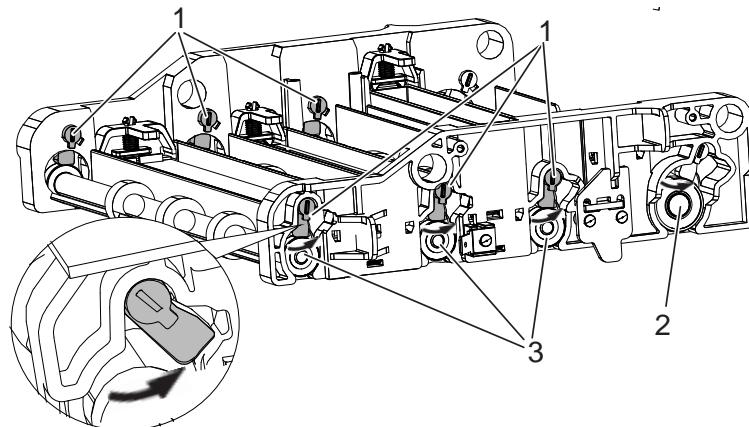
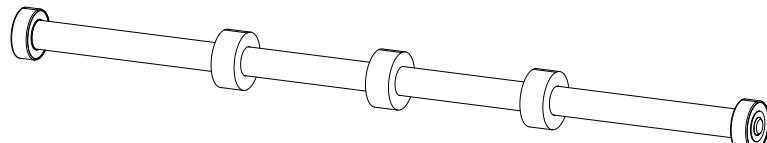


Figure 70: Sensor Transport Rollers removal

- [1] Turn the respective lock bearings (1) in anticlockwise direction to unlock (on both sides).
- [2] Remove the MTS (2) and the transport rollers (3) from the lower sensor housing.

Result ⇒ The MTS and the transport rollers are removed.



5.11 Removing the Back Side Board



Important!

- Always, clean the connectors on the PCB side and flex cable connectors before installing.
- When connecting the flex cables, ensure that the flex cables are connected in the direction as shown in the figure below. In the correct position, blue part of the flex cable should always be visible on the upper side.



Figure 71: Correct Direction of Flex Cables

5.12 Removing the Primary Image Sensors (PIS 1 and PIS 2)

Primary Image Sensor (PIS) unit is divided into PIS 1 (lower sensor housing) and PIS 2 (upper sensor housing). Always replace PIS 1 and PIS 2 in pair.

Requirements

- The upper sensor housing removed.
→ *Section 5.8 “Removing the Upper Sensor Housing”, p. 119*
- The lower sensor housing removed.
→ *Section 5.10 “Removing the Lower Sensor Housing”, p. 130*

Removing the PIS 1 (Lower Sensor Housing)

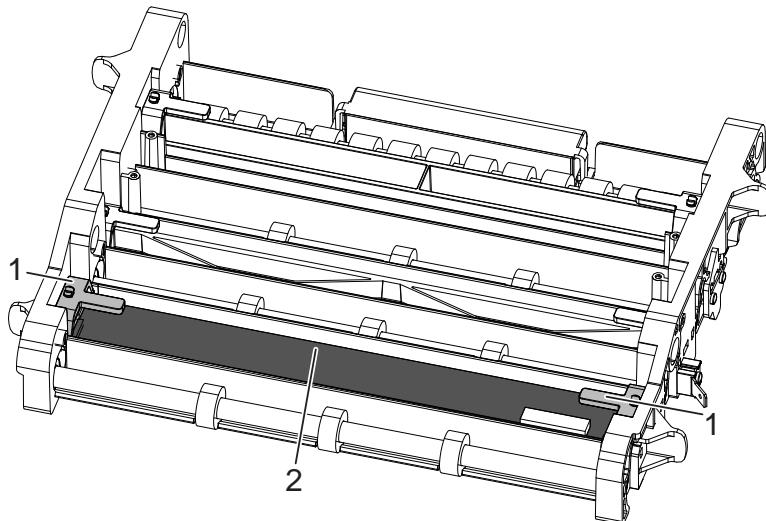


Figure 72: PIS 1 Removal

- [1] Remove the locking latches (1) on both sides.

**Important!**

Press and move the locking latch (1) sideways till it is removed from its position.

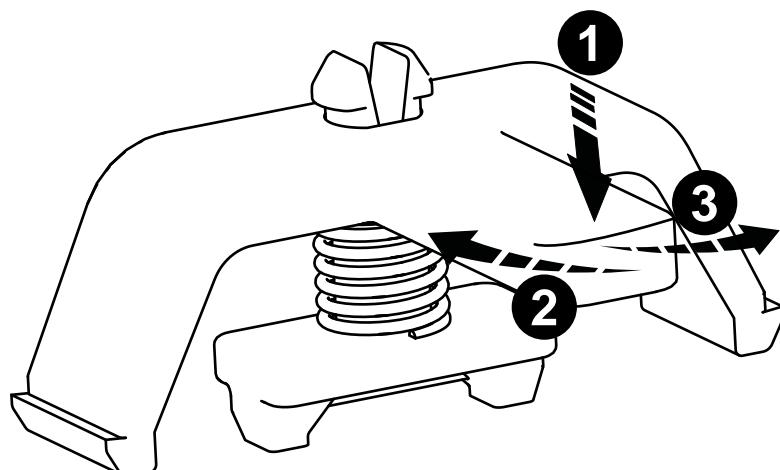


Figure 73: Locking Latch Removal

- [2] Remove the PIS 1 (2) from the Lower sensor housing.

Removing the PIS 2 (Upper Sensor Housing)

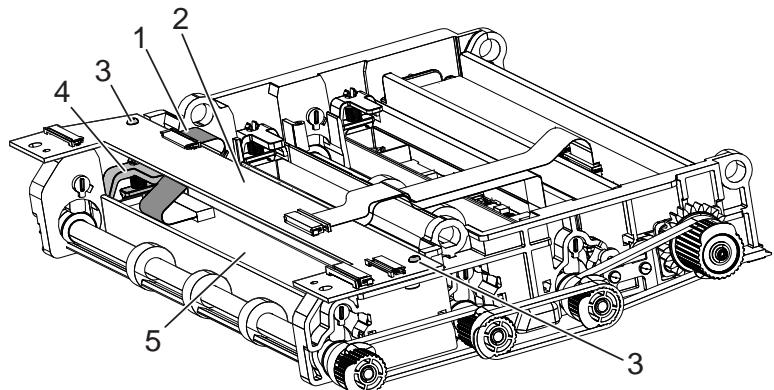


Figure 74: PIS 2 Removal

- [3] Gently, unlock and unplug the PIS 2 flex cable (1) from the connector on the BASB (2).
- [4] Remove the screws (3) on the BASB (2).
- [5] Along with the flex cables, dismount the BASB (2) from the upper sensor housing.

**Important!**

Press and move the locking latch (4) sideways till it is removed from its position.

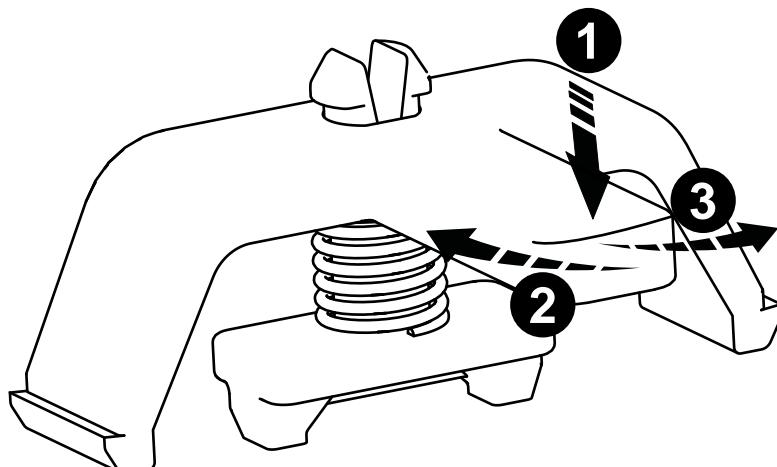
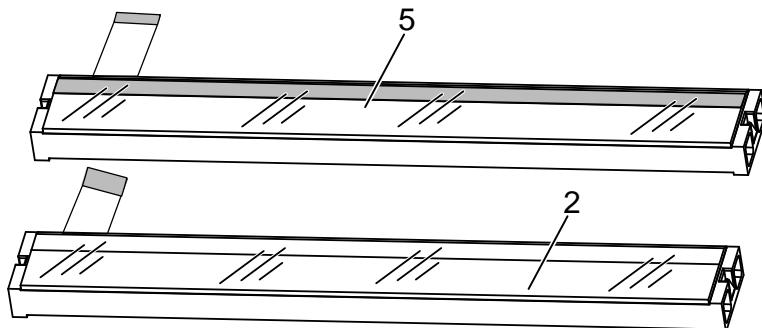


Figure 75: Locking Latch Removal

- [6] Remove the locking latches (4) on both sides.
- [7] Remove the PIS 2 (5) from the upper sensor housing.

Result

⇒ The PIS 1 and PIS 2 are removed.

**Important!**

Presence of light guide strip (grey colored) on the PIS 2 differentiates from PIS 1.

5

5.13 Replacing the PCB Main

The PCB Main is located at the bottom of the BPS C5.

The PCB Main consists of the following parts for replacement.

- Battery, 3V
- Fuse, 6.3A
- DP processor
- Sensor processor

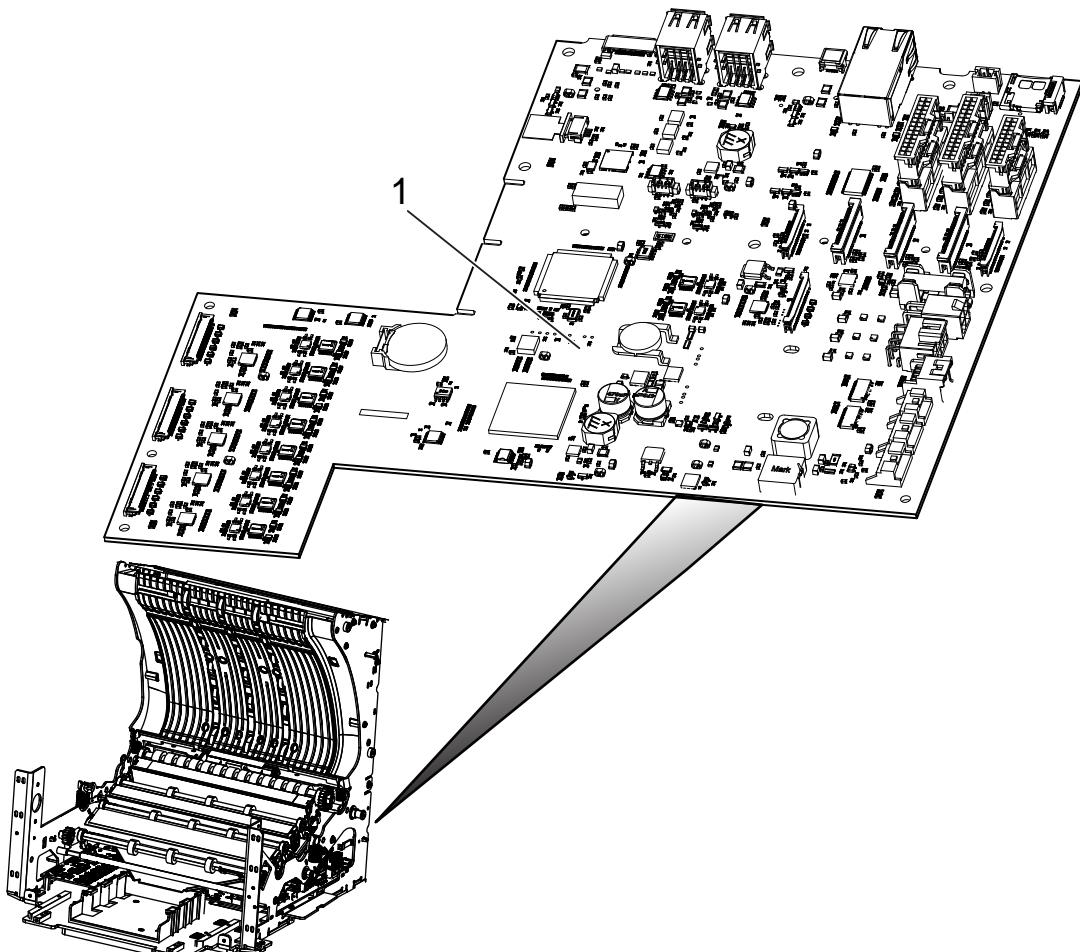


Figure 76: PCB Main Overview



Important!

For any above parts replacement (expect fuse), the PCB Main is removed from the BPS C5.

→ *Section 5.13.1 “Removing the PCB Main”, p. 139*

5.13.1 Removing the PCB Main

Requirements

- The ICM is removed.

→ *Section 5.9 “Removing the Input Coupling Module (ICM)”, p. 128*

**NOTICE**

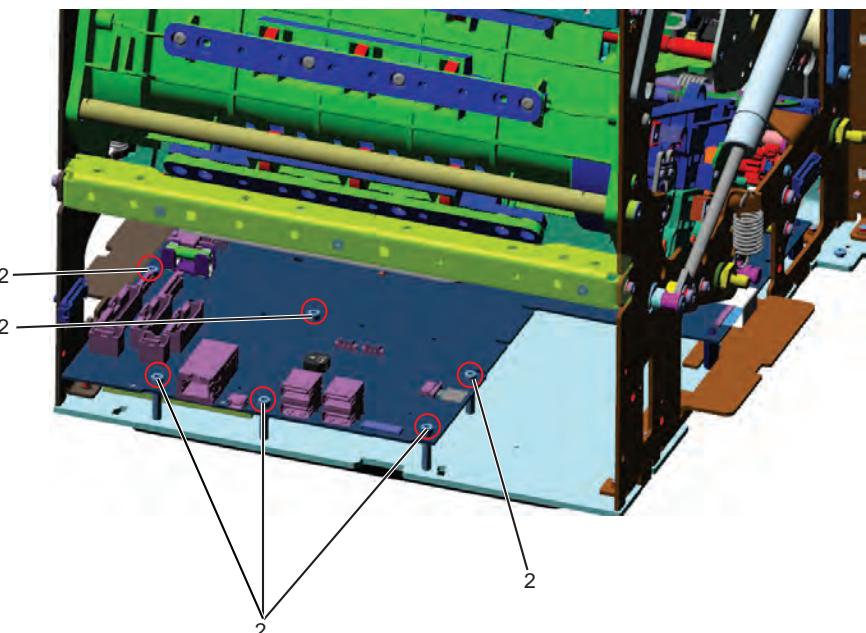
Incorrect handling

can cause damage to PCB Main.

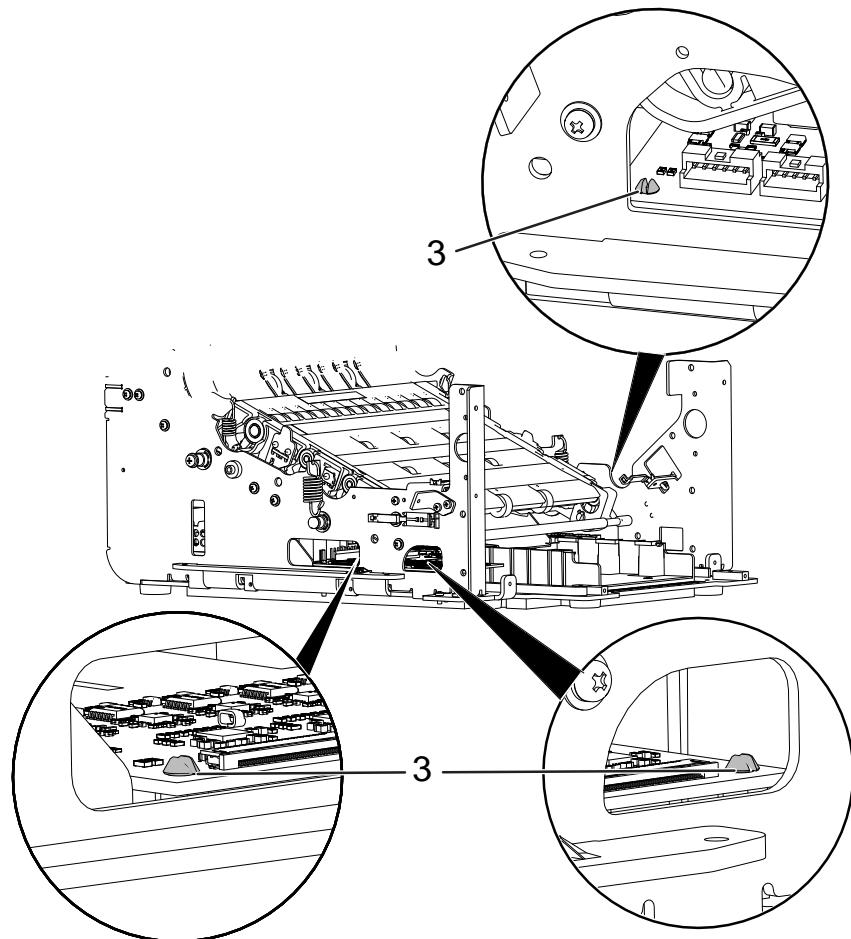
Ensure the capacitors on the PCB Main do not hit the frame, while removing.

Removing the PCB Main

- [1] Remove all the connectors from the PCB Main.



- [2] Remove the screws (2).



5

- [3] Lift the PCB Main to release from the stand-offs (3) (on both sides).
- [4] Slide and then remove the PCB Main from rear of the BPS C5.
- Result ⇒ The PCB Main is removed.

**Important!**

The PCB main replacement procedures are not complete until the software is updated.

→ *Section 7.14.6 “Updating Software After DP Processor Replacement”, p. 249*

→ *Section 7.14.5 “Updating Software After Sensor Processor Replacement”, p. 245*

5.13.2 Replacing the Processors

The processors (1, 2) are located the bottom of the PCB Main.

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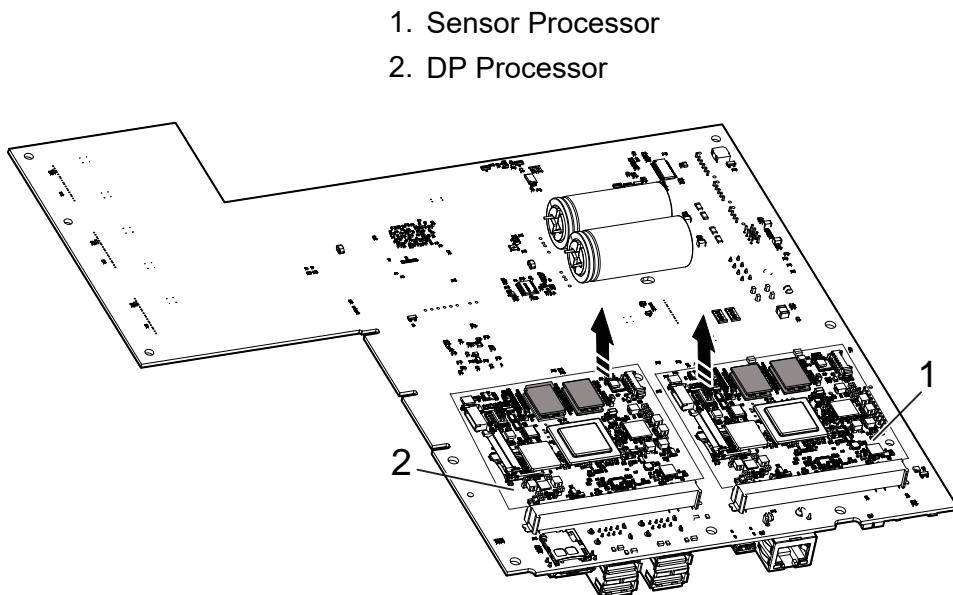


Figure 77: Processors Overview

Requirements

The PCB Main removed.

→ *Section 5.13.1 “Removing the PCB Main”, p. 139*



Important!

Pay attention while lifting the processors from the stand-offs.

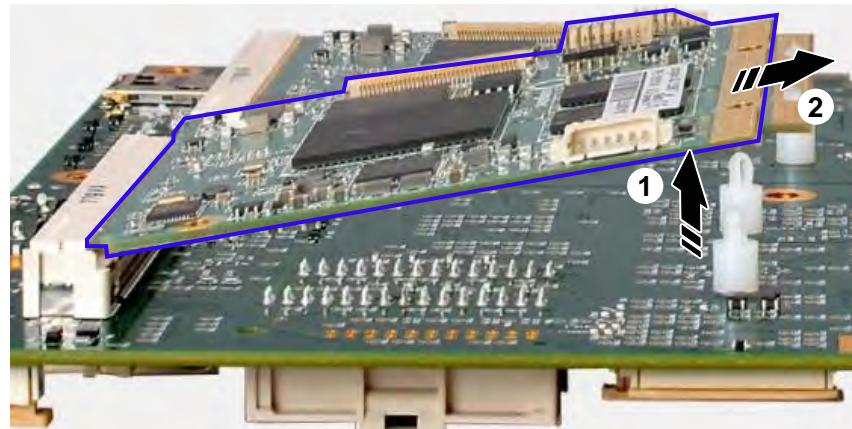


Figure 78: Processors Removal

Removing the Processors

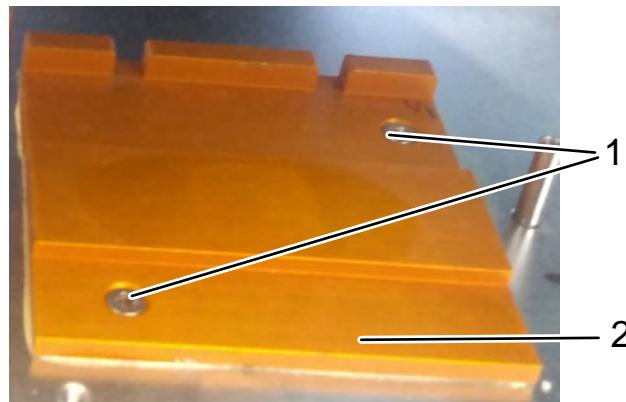
- [1] Lift the processors to release from the stand offs.
- [2] Slide and then remove the processor from the respective connector locations.

Installing the DP Processor

**Important!**

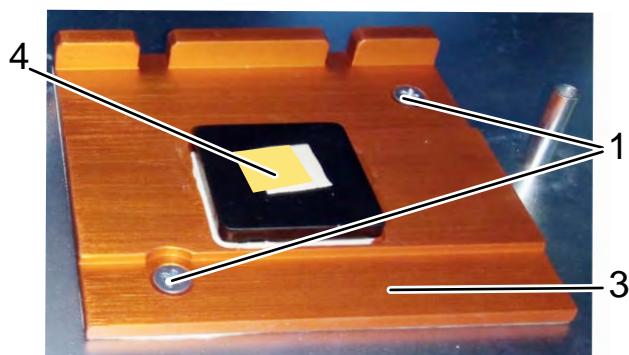
Always install the new DP processor with the new heat sink provided.

Ensure to install the SD card from old DP processor to the new DP processor and then restore the backup data to it.



5

- [3] Remove the two screws (1) from the heat sink (2).
- [4] Remove the heat sink (2) from the base frame of the .



- [5] Using the screws (1), install the new assembled heat sink (3).

**Important!**

Do not remove the heat sink if you are not replacing it.

Perform step 3 through step 5 only if the heat sink is replaced.

- [6] Peel off the cover (4) from the adhesive top.



- [7] Install the DP processor on the PCB Main.

Installing the Sensor Processor

- [8] Installation is in reverse order of removal.

Result

- ⇒ The processors are replaced.



Important!

The DP and sensor processor replacement procedures are not complete until the software is updated.

→ *Section 7.14.6 “Updating Software After DP Processor Replacement”, p. 249*

→ *Section 7.14.5 “Updating Software After Sensor Processor Replacement”, p. 245*

5.14 Replacing the Fuses

The fuse protection for the main power input is provided by two pluggable cartridge fuses of value 10 A each.

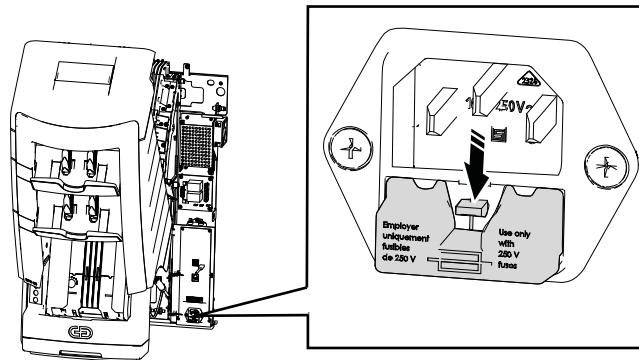
Requirements

- The BPS C5 is switched Off.

→ *BPS C5 Service Manual*

- Unplug the power plug from the power socket and secure the BPS C5 against being switched back on.

Procedure



- [1] Press and remove the fuse holder.
- [2] Remove both the fuses from the holder.
- [3] Install the new fuses.

Result \Rightarrow The fuses are replaced.

5

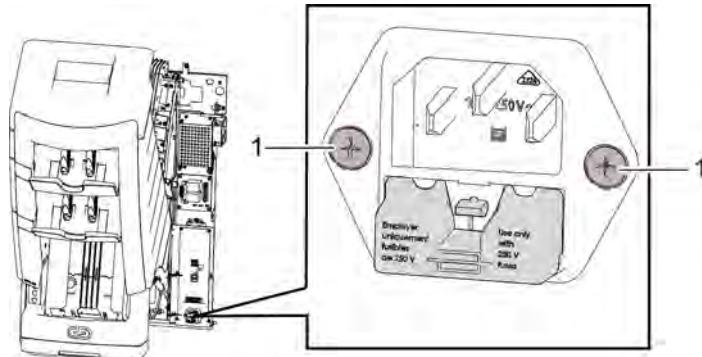
5.15 Replacing the Cable Harness Connector Switch

Requirements

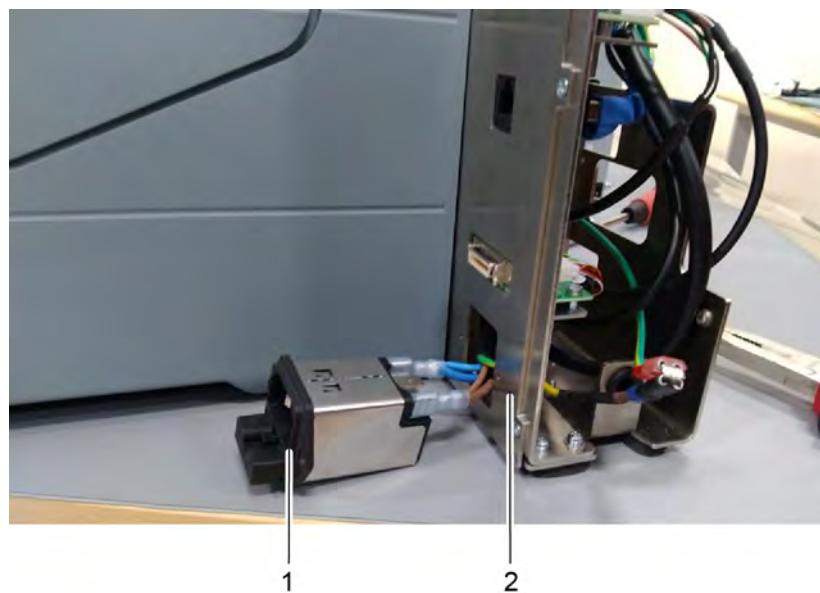
- The BPS C5 is switched Off.
→ *BPS C5 Service Manual*
- Unplug the power plug from the power socket and secure the BPS C5 against being switched back on.
- The power supply cover is removed.
→ *BPS C5 Service Manual*
- The IM is disconnected from the SDM.
→ *BPS C5 Installation Manual*

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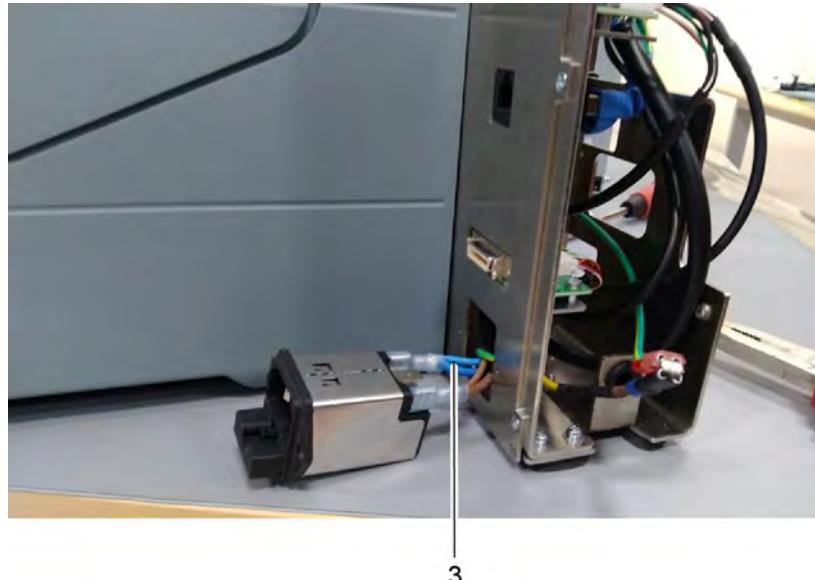
Procedure



[1] Remove the two screws (1).



[2] Remove the power entry input line filter (1) from the IM (2).



5

- [3] Remove the cable (3) from the power entry input line filter and the power switch.

**DANGER**

Danger of electric shock

Damaged cables or plugs can cause electric shock, short circuits, fire, etc. This may result in death or serious injury.

- Ensure that plugs or cables are not crushed or placed under extreme weight.
- Ensure that the cables are routed safely.
- Ensure that the cables do not hang out.

**Important!**

While connecting the cable (Art no. 527843001) to the power switch, maintain the following color combinations.

- Input and output - blue - left side
- Input and output - brown - right side

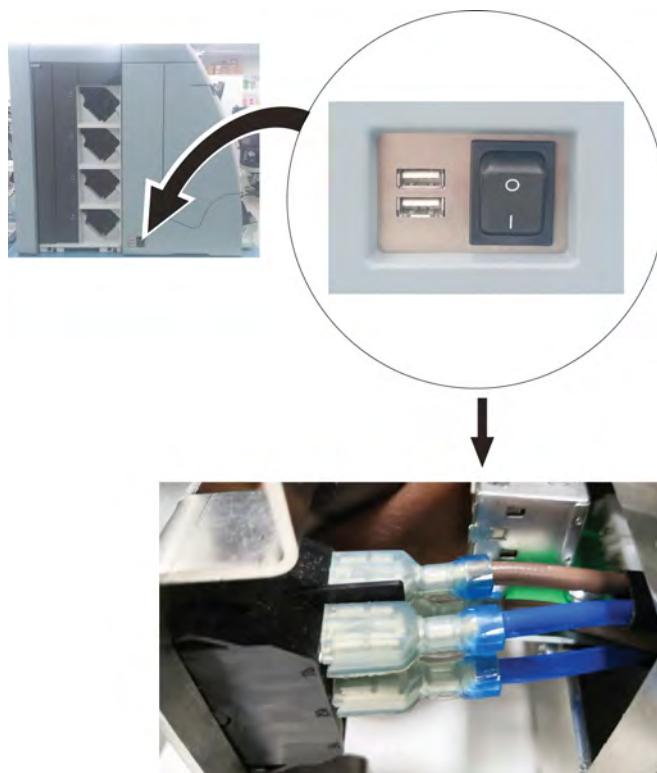
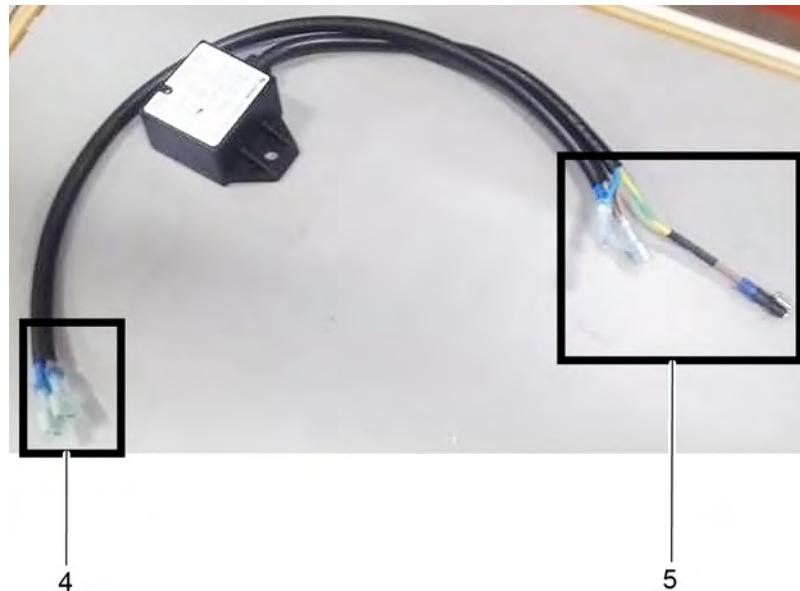


Figure 79: Connection to Power Switch



- [4]** Connect the cable (Art no. 527843001) to the power switch and power entry input line filter.
Connect the cable end (4) to power switch and the cable end (5) to power entry input line filter.

5

**Important!**

While connecting the cable (Art no. 527843001) to power entry input line filter, maintain the following color combinations.

- Center - green and yellow (earth)
- Left - blue
- Right - brown

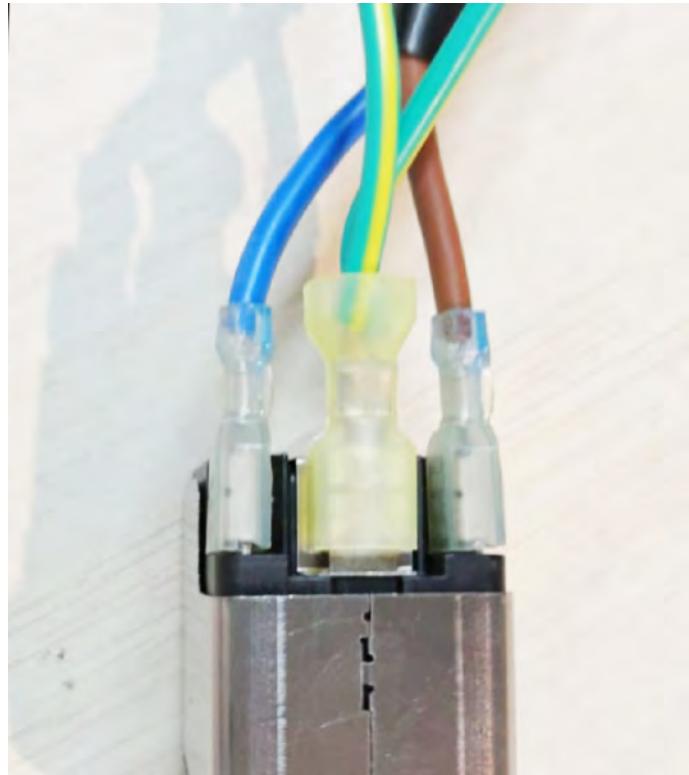
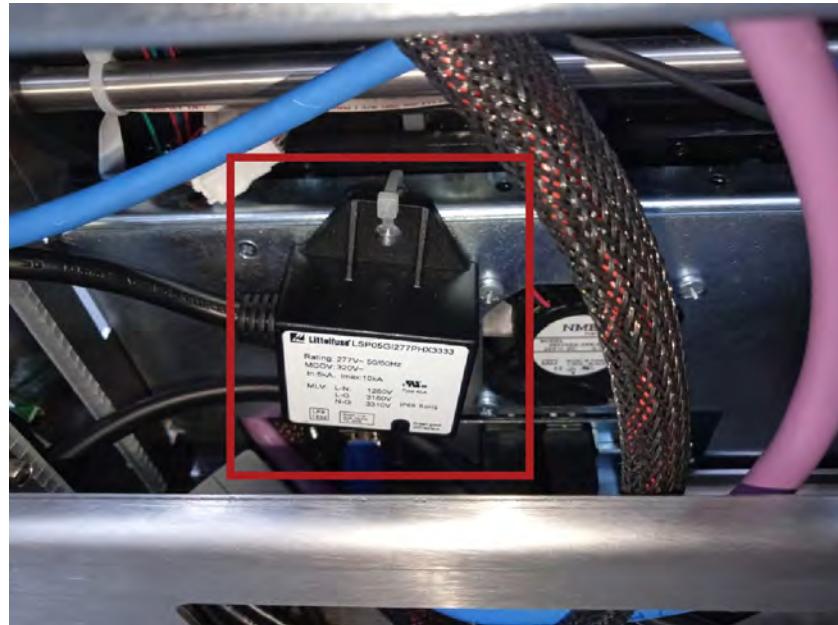


Figure 80: Connection to Power Entry Input Line Filter



5

- [5] Strap the connector switch with a cable tie.



Important!



Figure 81: Green Light Glowing

Green light indicates proper working of the connector switch.
If there is no green light, replace the connector switch with the new one (Art no. 527843001).

- [6] Install the power supply cover.
→ *BPS C5 Service Manual*

Result ⇒ The cable harness connector switch is replaced.

5.16 Replacing the Cable Harness RLY-SDM PWR

Requirements

- The BPS C5 is switched Off.
→ *BPS C5 Service Manual*

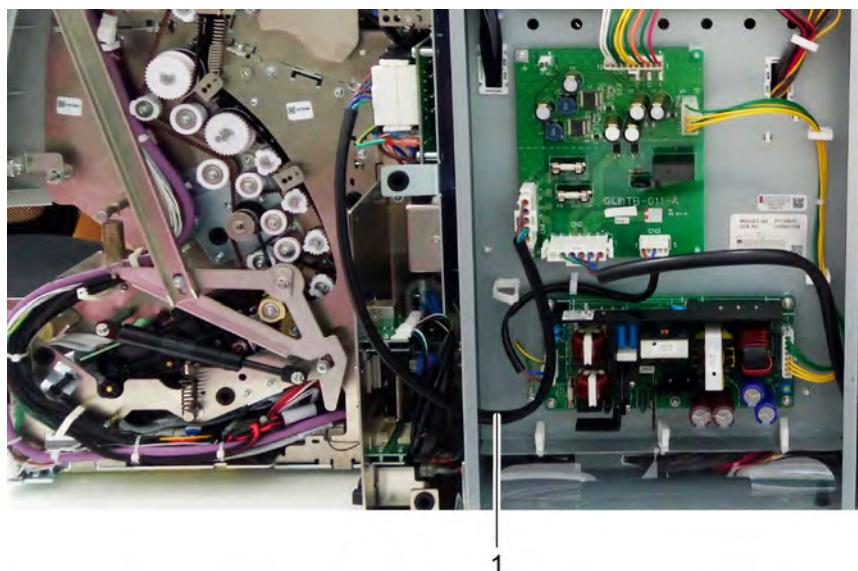
- Unplug the power plug from the power socket and secure BPS C5 against being switched back on.

- The power supply cover is removed.
→ *BPS C5 Service Manual*

- The SDM rear cover is removed.
→ *BPS C5 Service Manual*

5

Procedure



- [1] Unplug the cable (1) from relay board and SDM.

**DANGER**

Danger of electric shock

Damaged cables or plugs can cause electric shock, short circuits, fire, etc. This may result in death or serious injury.

- Ensure that plugs or cables are not crushed or placed under extreme weight.
- Ensure that the cables are routed safely.
- Ensure that the cables do not hang out.

- [2] Install the cable (Art. no. 524966001).

Result ⇒ The cable harness RLY-SDM PWR is replaced.

5.17 Replacing the Cable Harness SDM-SDM PWR CP

Requirements

- The BPS C5 is switched Off.
→ *BPS C5 Service Manual*
- Unplug the power plug from the power socket and secure the BPS C5 against being switched back on.
- The SDM rear cover is removed.
→ *BPS C5 Service Manual*
- Rear covers of both the SDMs are removed.
→ *BPS C5 Service Manual*

5

Procedure



- [1] Unplug the cable (1) from both the SDMs.

**DANGER**

Danger of electric shock

Damaged cables or plugs can cause electric shock, short circuits, fire, etc. This may result in death or serious injury.

- Ensure that plugs or cables are not crushed or placed under extreme weight.
- Ensure that the cables are routed safely.
- Ensure that the cables do not hang out.

[2] Install the cable (Art. no. 520930011).

Result

⇒ The Cable Harness SDM-SDM PWR CP is replaced.

5

5.18 Removing the Guide Roller Assembly (3R 20 MM)

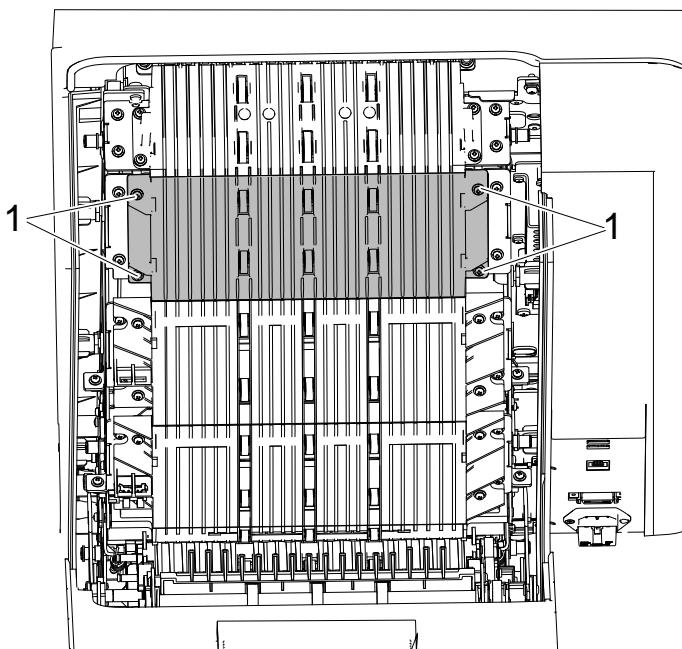
There are eight guide roller assemblies in Input Coupling Module ICM and six guide roller assemblies in base module of Input Base Module IBM.

Requirements

- The BPS C5 is opened.

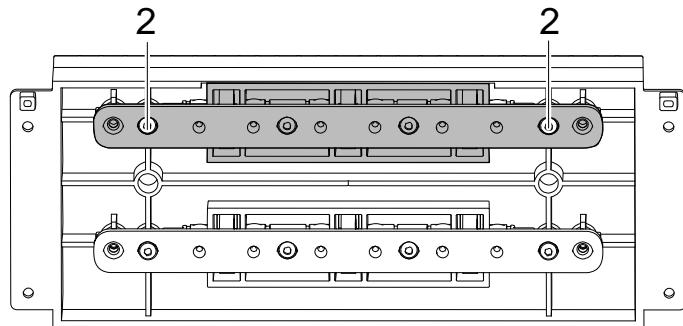
→ *Section 5.1.2 “Opening and Closing BPS C5”, p. 64*

ICM Guide Roller Assemblies



[1] Remove the screws (1) from the respective guide plate of ICM.

- [2] Remove the guide plate.



- [3] Remove the screws (2) from the respective guide roller assembly.

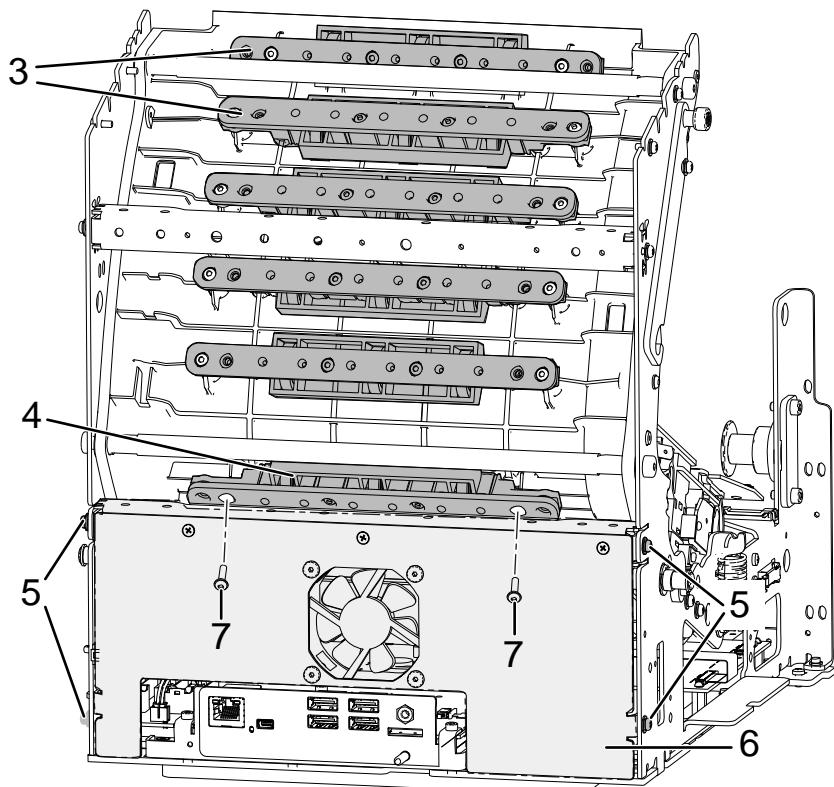
- [4] Remove the guide roller assembly.

IBM Guide Roller Assemblies

- [5] Remove the ICM.

→ *Section 5.9 “Removing the Input Coupling Module (ICM)”, p. 128*

5



- [6] For guide roller assembly (4), remove the screws (5).

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- [7] Gently slide out the fan plate (6) to create gap for the guide roller screws removal. Do not remove it completely.
- [8] Remove the screws (7).
- [9] Remove the guide roller assembly (4).
- [10] Follow the step 8 for remaining guide roller assemblies.

Important!

During installation, ensure that the Guide Roller 3R 20 mm MOD Assy is installed in the guide roller assembly (3).
Guide Roller 3R 20 mm Assy is installed in all the other locations.

5

Sometimes, gaps may be observed between the base module and the base transport module at the guide plate 3 location.

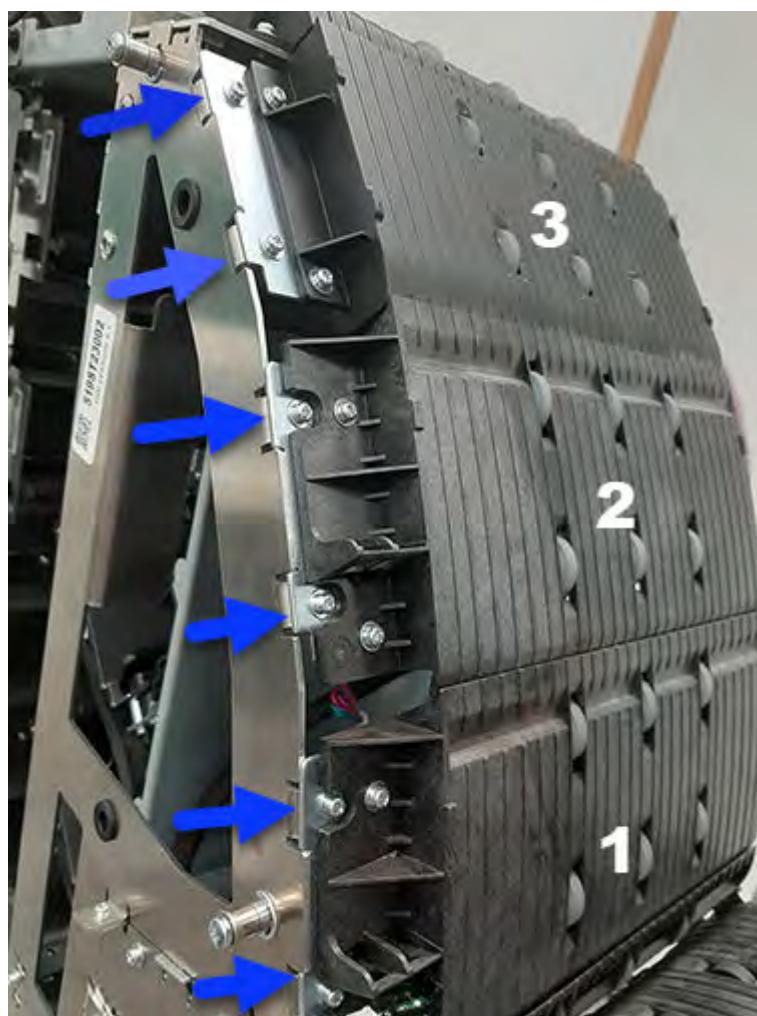


Figure 82: Guide Plate Locations

Gap in the transport path may result in frequent fail-safe error or banknote jam during banknote processing.

To resolve this issue, plain washers (3,000) between the metal plates in the base transport module.

- [11] Remove guide plates 1, 2, and 3 as shown in the figure above.
- [12] Install 12 washers between the metal plates as shown by arrows in the image above.
Ensure that the washers are installed properly on both sides.

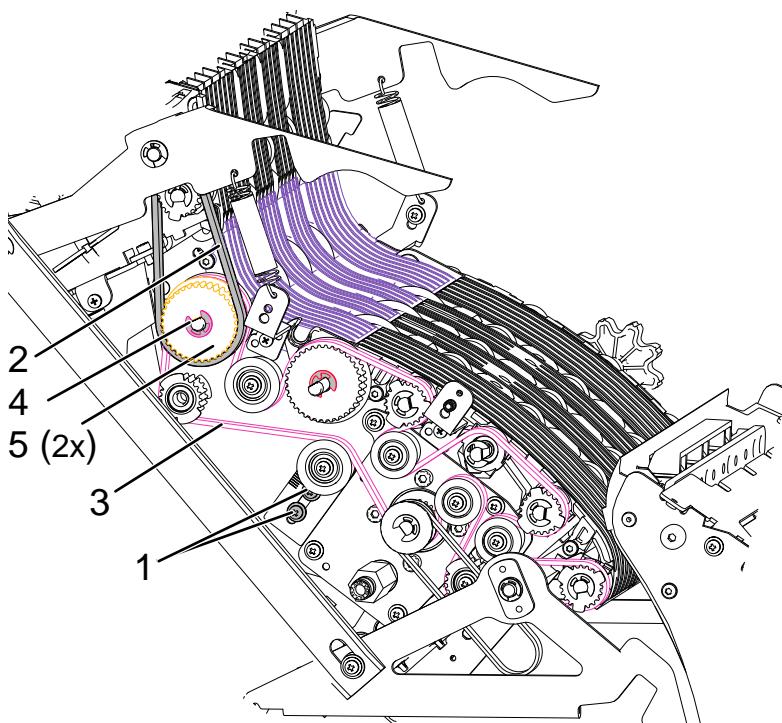
Result \Rightarrow The guide roller assembly (3R 20 MM) is removed.

5.19 Removing the Drive Roller 35 D

Requirements

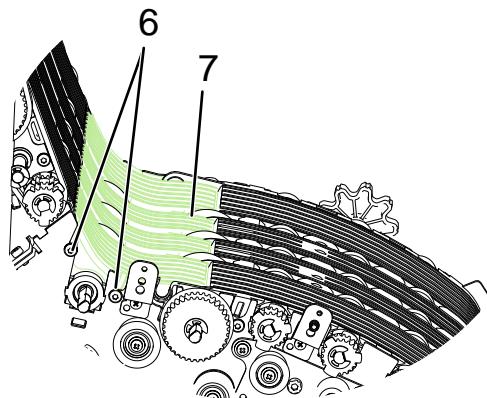
- The front and rear covers are removed.
→ *Section 3.8.1.4 “Removing the Front Cover”, p. 36*
→ *Section 3.8.1.7 “Removing the Rear Cover”, p. 43*

Procedure



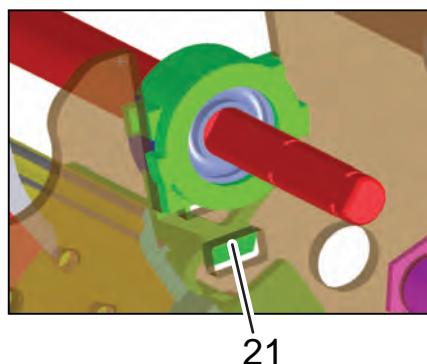
- [1] Loosen the two belt tensioner screws (1).
- [2] Dismount the belt (2) and belt (3).

- [3] Remove the circlip (4) and then remove the two drive pulleys (5) from the transport shaft.

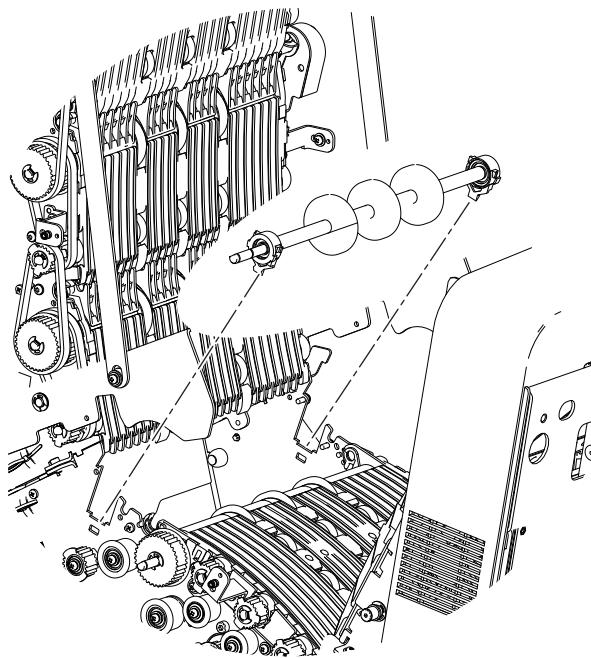


5

- [4] Remove the screws (6) on both sides of the guide plate 6 (7).
- [5] Remove the guide plate 6.



- [6] Release the interlock of the bearing case (21) on both sides.



[7] Remove the drive roller 35 D from the BPS C5.

Result

⇒ The drive roller 35 D is removed.

5.20 Removing the Drive Roller Assembly 20 D

Requirements

- The guide plate 6 is removed.

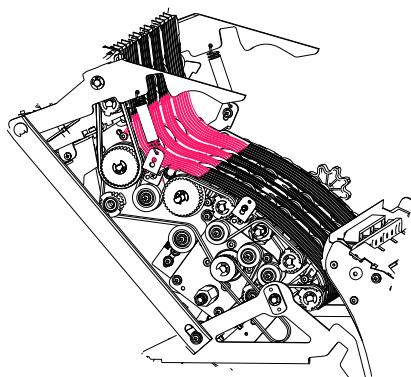
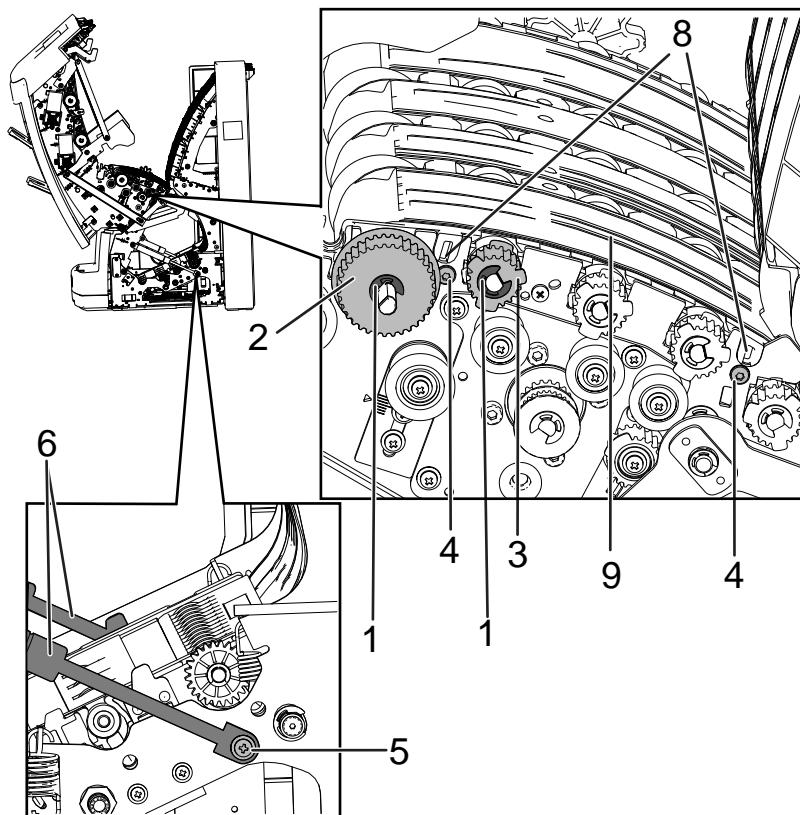


Figure 83: Guide plate 6 Removal

Follow the procedure from step 1 to step 5 in → *Section 5.19 "Removing the Drive Roller 35 D", p. 157*

Procedure

5



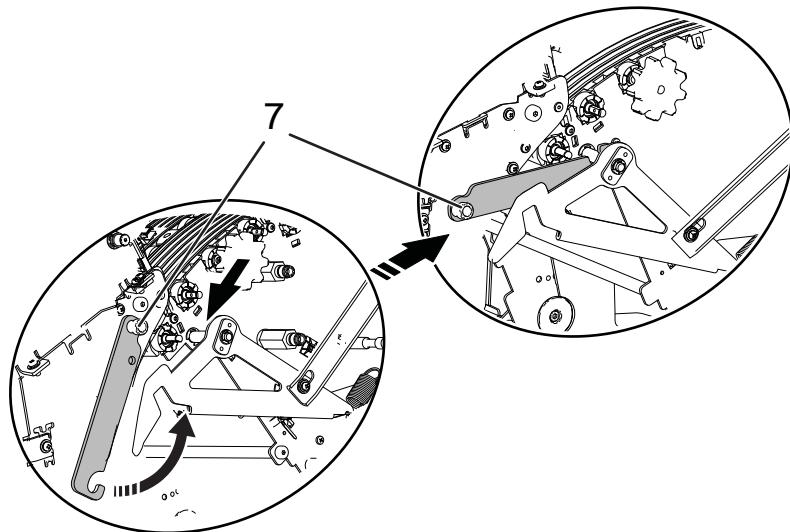
- [1] Remove the circlips(1).
- [2] Remove the timing belt pulley 35 D (2) and timing belt pulley 20 D (3).
- [3] Remove the two screws (4) on both sides of the guide plate (9).

**CAUTION**

Removal of gas springs on both sides from the BPS C5 may result in toppling of the front module.

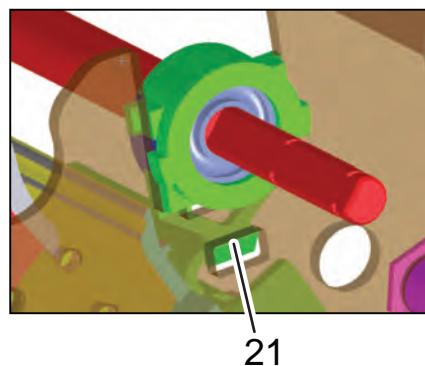
One person must hold the front module while removing the gas springs and operating with the mechanical stopper.

- [4] Remove the gas spring screw (5) on both sides.
- [5] Detach the gas springs (6) on both sides.
- [6] Gently pull the front module forward to create gap for the guide plate (9) removal.

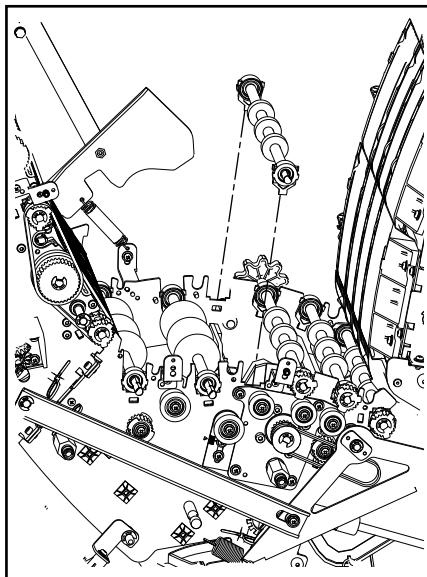


5

- [7] Loosen the knurled screw (7).
- [8] Turn the mechanical stopper in anticlockwise direction and lock it to the shaft.
- [9] Tighten the knurled screw (7).
- [10] Using flat screw driver in the guide plate slots (8) on both sides, remove the guide plate (9) from the BPS C5.



- [11] Release the interlock (21) of the bearing case on both sides of the drive roller assembly.



[12] Remove the drive roller assembly 20 D from the BPS C5.

Result

⇒ The drive roller assembly 20 D is removed.

5.21 Replacing Horizontal Transport Module in Standard Delivery Module

Requirements

- The BPS C5 is switched Off.
→ *Section 5.1.1 "Switching BPS C5 On and Off", p. 63*
- Unplug the power plug from the power socket and secure the machine/device against being switched back on.
- The horizontal transport door is removed.
→ *Section 3.8.2.4 "Removing the Horizontal Transport Door (SDM)", p. 53*

Procedure

[1] Loosen the screws (1).

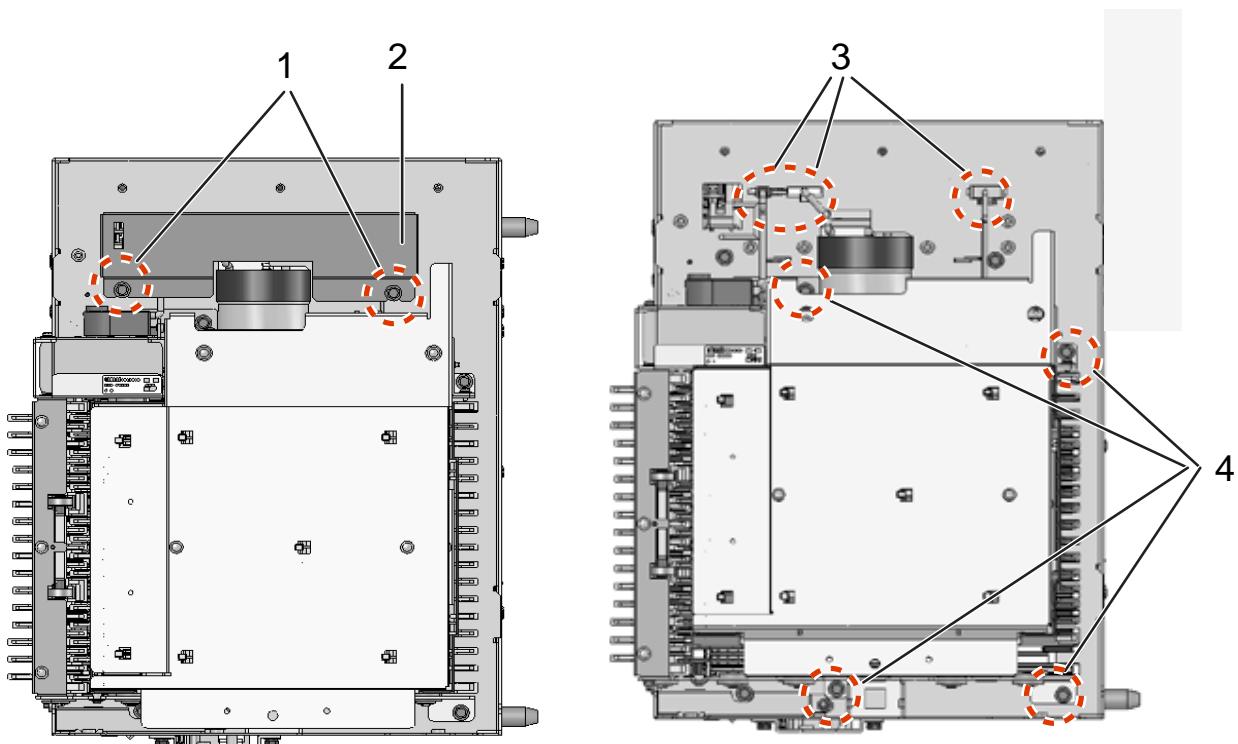
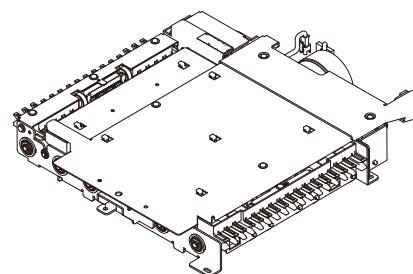


Figure 84: Horizontal Transport Unit Removal

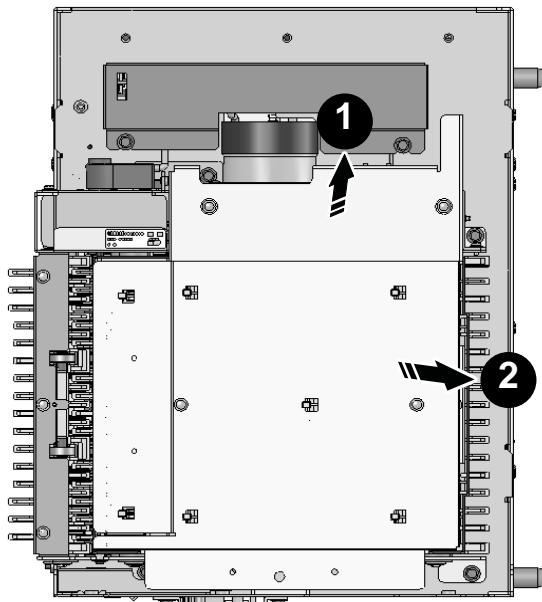
- [2] Remove the cover (2).
- [3] Disconnect the connectors (3).
- [4] Open the horizontal transportation unit and then remove the screws (4).



- [5] Remove the horizontal transport unit.
- [6] Place the horizontal transport unit on the SDM. Install the screws (4). Do not tighten the screws at this point.

Assembling

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- [7] Adjust the unit as shown and then tighten all the screws.
- [8] Connect the connectors (3).
- [9] Install the cover (2).
- Result ⇒ The horizontal transport unit is replaced.

5.22 Replacing Vertical Transport Module in Standard Delivery Module (SDM)

- Requirements
- The BPS C5 is switched off.
→ *Section 5.1.1 “Switching BPS C5 On and Off”, p. 63*
 - Unplug the power plug from the power socket and secure the machine/device against being switched back on.
 - The stacker display assembly is removed.
→ *Section 5.24 “Replacing the Stacker Display Assembly in Standard Delivery Module (SDM)”, p. 169*
 - The horizontal transport module is removed.
→ *Section 5.21 “Replacing Horizontal Transport Module in Standard Delivery Module”, p. 162*
 - All the SDM stacker units are removed.
→ *Section 5.25 “Replacing the Stacker Units in Standard Delivery Module (SDM)”, p. 170*

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Procedure

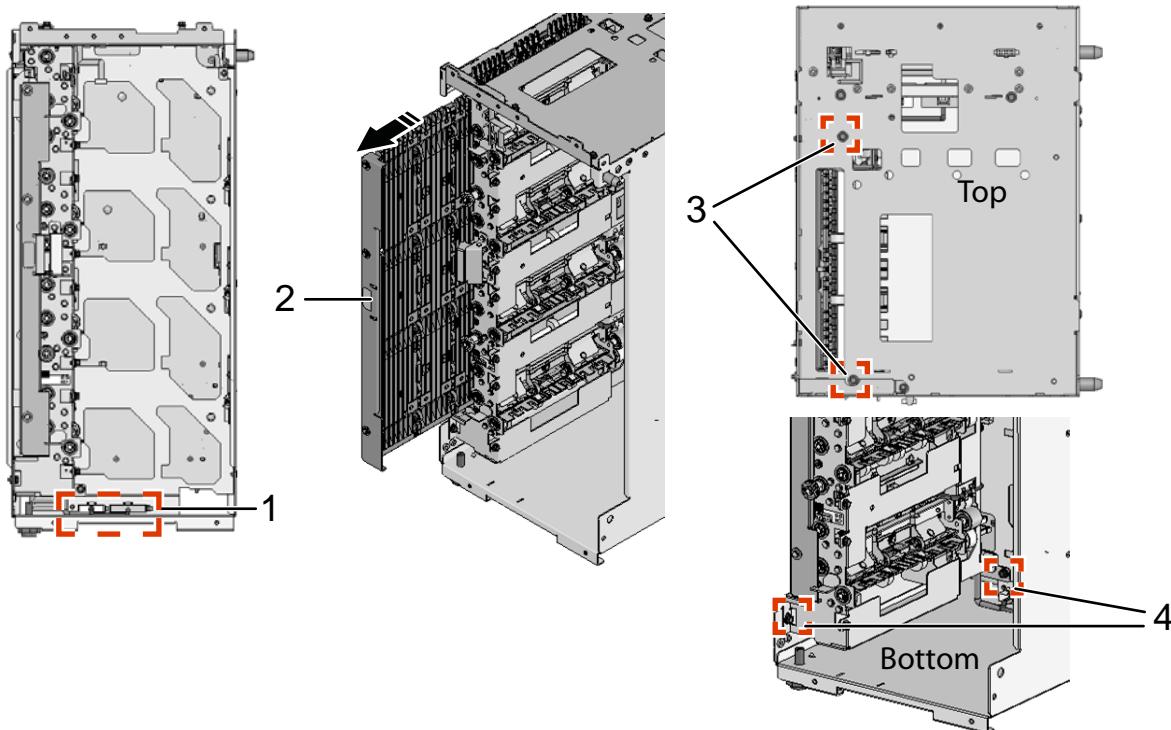


Figure 85: Vertical Transport Module Removal

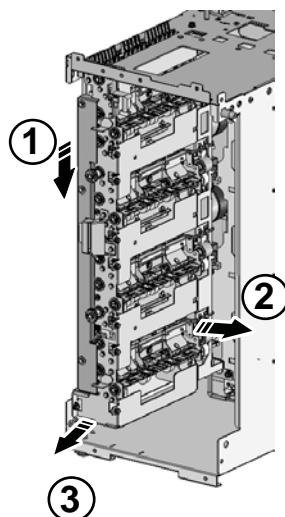
- [1] Disconnect the connectors (1).
- [2] Unlock the lever and remove the vertical transport guide 5 (2).
→ Section 5.1.2.3 “Opening Vertical Transport Path of Standard Delivery Module (SDM)”, p. 67
- [3] Remove the top screws (3)

**CAUTION**

Removal of bottom screws (4) from the vertical transport module may result in fall and damage of the module.
Hold the module with one hand while removing the bottom screws (4).

- [4] Remove the bottom screws (4).

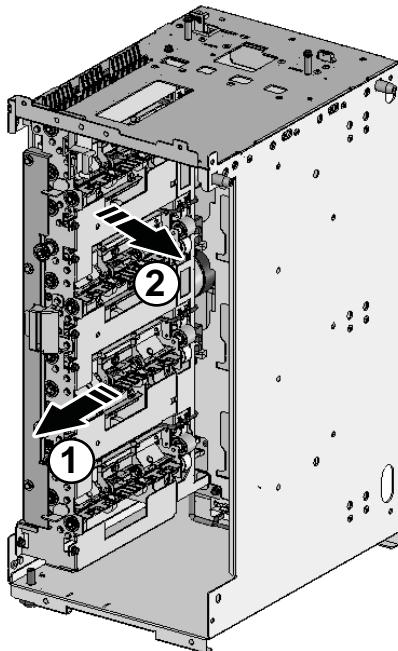
5



- [5] Remove the vertical transport module from the SDM as shown.

Assembling

- [6] Place the vertical transport module.
Install the screws (hand tight). Do not tighten the screws at this point.



- [7] Adjust the module as shown and then tighten all the screws.
[8] Installation is in logical reverse order of removal.

Result

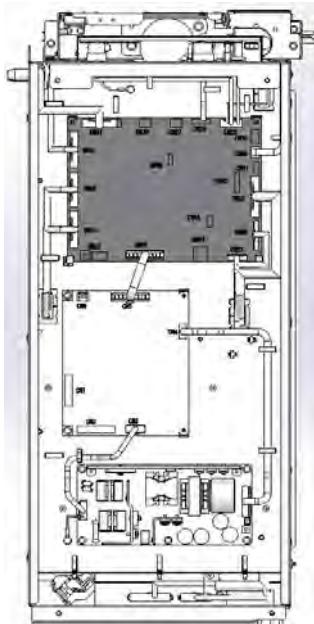
⇒ The vertical transport module is replaced.

5.23 Replacing SDM CPU Board

Requirements

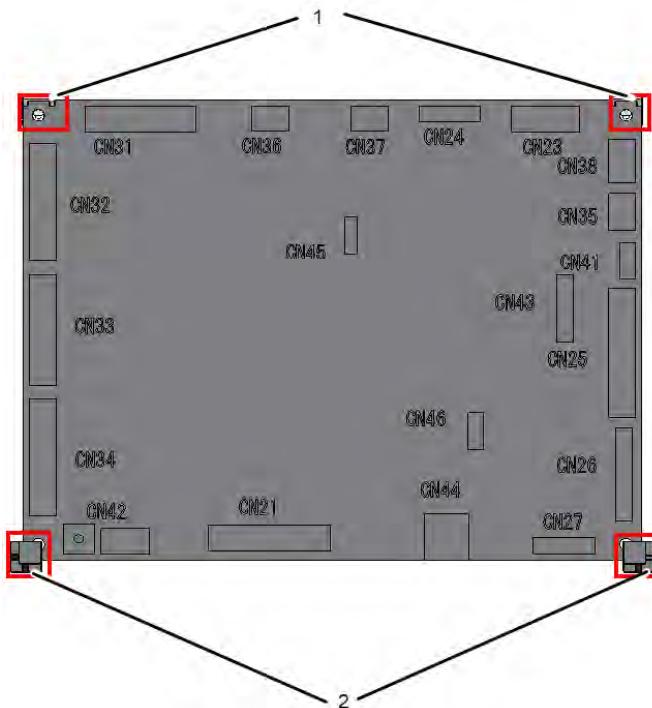
- Log files copied
→ *Section 7.17 “Copying Log Files to USB Stick”, p. 254*
- The BPS C5 switched off.
Secure the BPS C5 so that it can not be switched on again.
→ *Section 5.1.1 “Switching BPS C5 On and Off”, p. 63*
- SDM rear cover removed
→ *Section 3.8.2.2 “Removing the Rear cover”, p. 50*

Removing SDM CPU PCB



[1] Disconnect all the connectors from the PCB.

5



- [2] Detach the CPU PCB from the snap lock (1).
- [3] Lift up the CPU PCB to remove it from the slot (2).
 - ⇒ Now, the CPU PCB is removed.

Installing SDM CPU PCB

- [4] Place the bottom side of PCB in corner guide, and lock the PCB by edge lock.
- [5] Connect all the connectors.



- [6] Set the relay switch number, if required.
- ⇒ The SDM CPU PCB is replaced.

Result

5.24 Replacing the Stacker Display Assembly in Standard Delivery Module (SDM)

Requirements

- The BPS C5 is turned off.
→ *Section 5.1.1 “Switching BPS C5 On and Off”, p. 63*
- Unplug the power plug from the power socket and secure the machine/device against being switched back on.
- The SDM front cover is removed.
→ *Section 3.8.2.5 “Removing the Front Cover”, p. 55*

Procedure

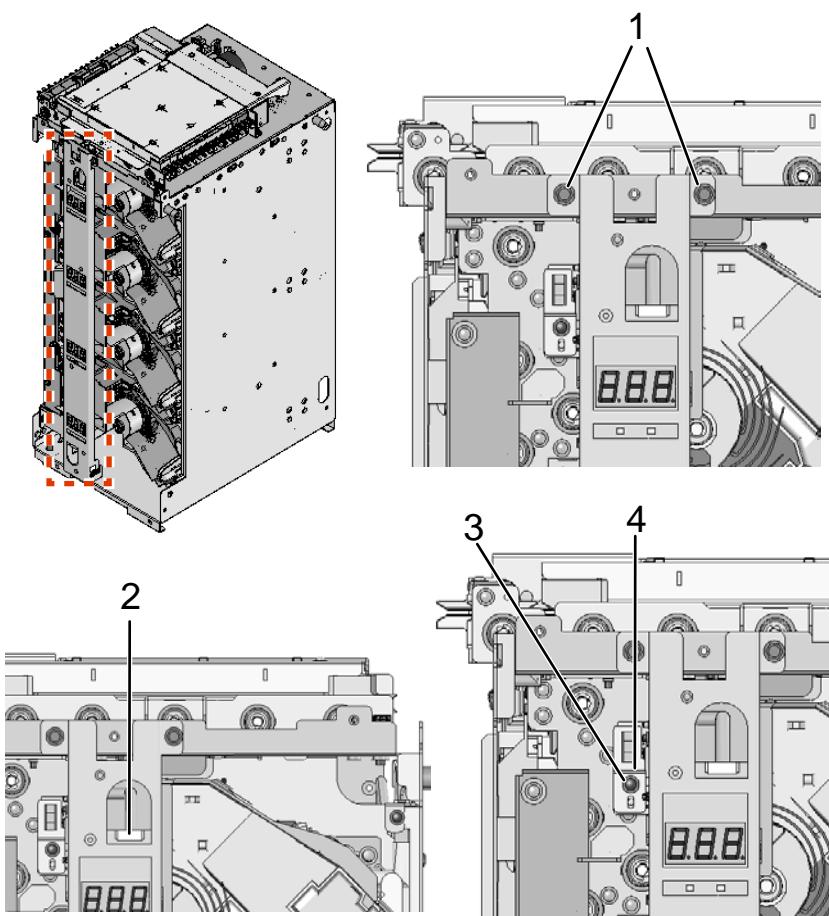
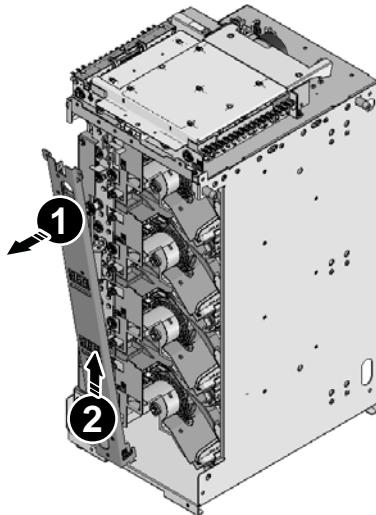


Figure 86: Stacker Display Connector Removal

- [1] Remove the screws (1).
- [2] Disconnect the connector (2) from the stacker display PCB.
- [3] Remove the screw (3) and then remove the sensor plate (4).



5

- [4] Remove the stacker display assembly.

Assembling

- [5] Place the stacker display assembly.
Installation is in logical reverse order of removal.

Result

- ⇒ The stacker display assembly is replaced.

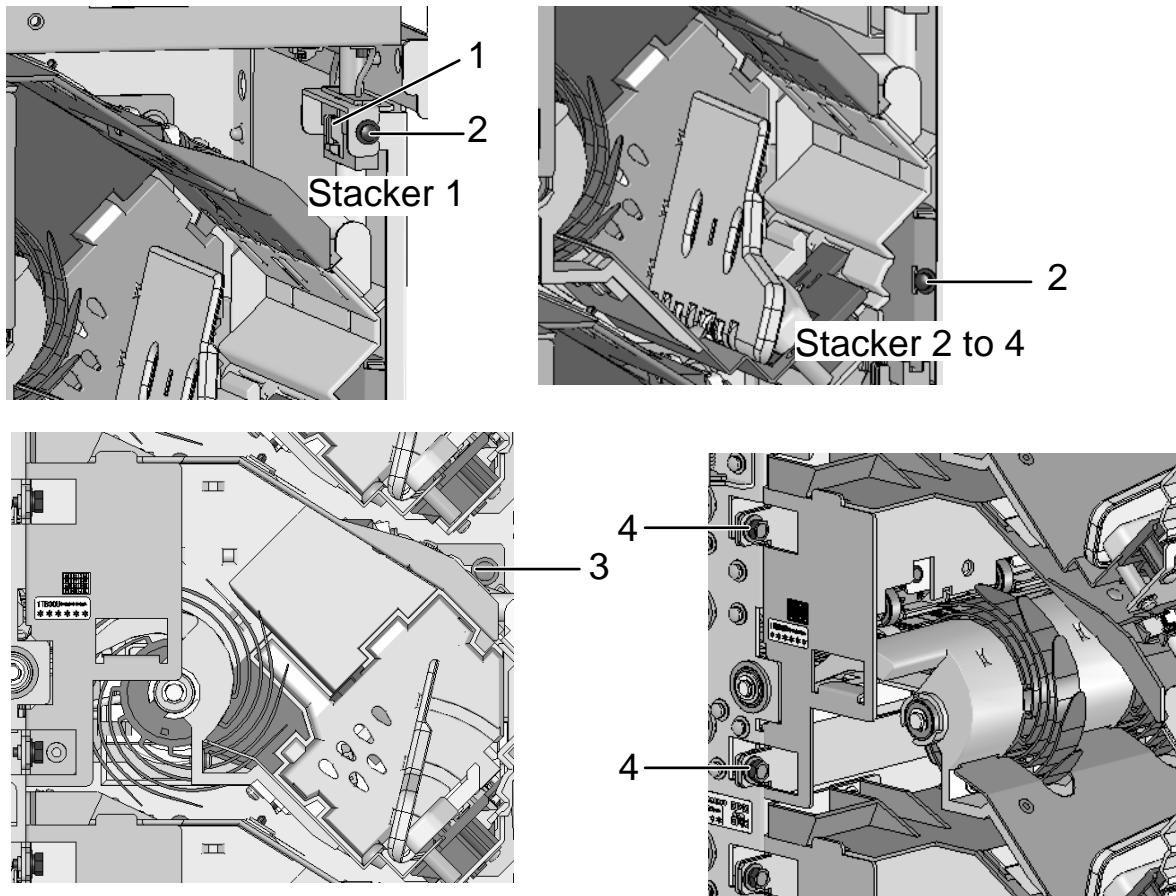
5.25 Replacing the Stacker Units in Standard Delivery Module (SDM)

Each SDM have four stacker units. Follow the stacker units removal from top to bottom.

Requirements

- The BPS C5 is turned off.
→ *Section 5.1.1 “Switching BPS C5 On and Off”, p. 63*
- Unplug the power plug from the power socket and secure the machine/device against being switched back on.
- The stacker display assembly is removed.
→ *Section 5.24 “Replacing the Stacker Display Assembly in Standard Delivery Module (SDM)”, p. 169*

Procedure



5

Figure 87: Mountings Removal

- [1] Disconnect the connector (1).
- [2] Remove the screw (2) from the mount.
- [3] Using long screw driver, loosen the screw (3). Do not remove it.
- [4] Remove the screws (4) from each stacker unit.
- [5] Push the banknote pusher (5) back till it stops.

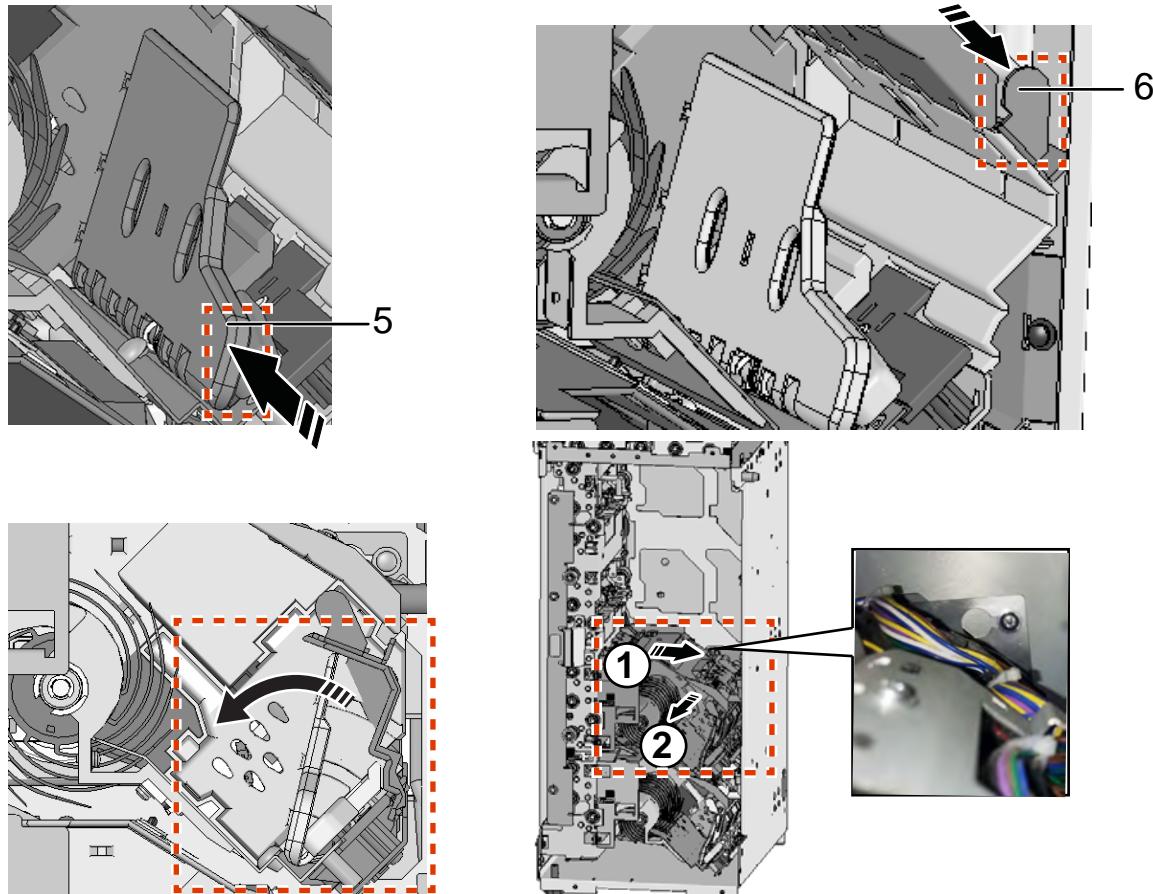


Figure 88: Stacker Units Removal

- [6] Pull the lever (6).
- [7] Turn the stacker unit frame to the left side.
- [8] Move the stacker unit to right and then remove the stacker unit to the front.

Assembling the Stacker Units

**Important!**

Installation of stacker units are from bottom to top.

- [9] Place the stacker unit .
Installation is in logical reverse order of removal.

Result

⇒ The stacker units are replaced.

6 System Adjustment

This chapter contains the following adjustment procedures:

- → *Section 6.1 "Adjust the Singler Gap", p. 173.*
- → *Section 6.2 "Adjusting the Retarding Wheels", p. 182.*
- → *Section 6.3 "Synchronizing the Singler Drum and the Hopper Wheels", p. 184.*

6.1 Adjust the Singler Gap

Singler gap to be adjusted for the following reasons: High rejection rate due to:

- Skew
- Closed feed
- Missed feed
- Uneven wear of certain spare parts

Therefore, various adjustments must be made in the singler area to resolve the above problems.

Singler must also be adjusted when you:

- Check/replace spare parts in the singler area as part of the regular maintenance work.

6.1.1 Verifying the Singler Adjustment Status

This procedure shows the process to verify the singler adjustment status.

Requirements

- Service login.
→ *Section 7.2 "Logging in as Service", p. 200*
- 100 to 200 used banknotes
Make sure that the banknotes are not torn or taped.
- The Banknotes should be well mixed in all four orientations

Procedure

- [1] Select .
- [2] Select the **997** OP mode.
- [3] Insert 100 to 200 used banknotes into the singler.

**Important!**

Make sure that the banknotes are not torn, taped or its corners are folded.

The Banknotes should be well mixed in all four orientations.

- ⇒ The banknotes are singled and sorted into the relevant stacker.

[4]

Select

**[5]**

Select the



tab.

- ⇒ The **Health** displays the singler health (number of rejects due to closed feed and multiple feed).

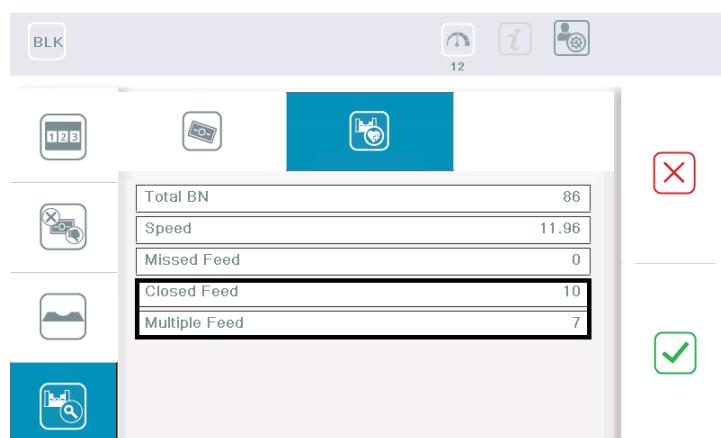


Figure 89: Singler Health View

If the closed feed, multiple feed and the missed feed count is higher than the acceptable range, perform basic adjustments of the singler → *Section 6.1.3 "Adjustments Via Singler Health Option", p. 176.*

[6]

Select the



tab.

- ⇒ The **Skew** displays the magnitude and direction of angle of Banknotes entering the sensor for authentication.

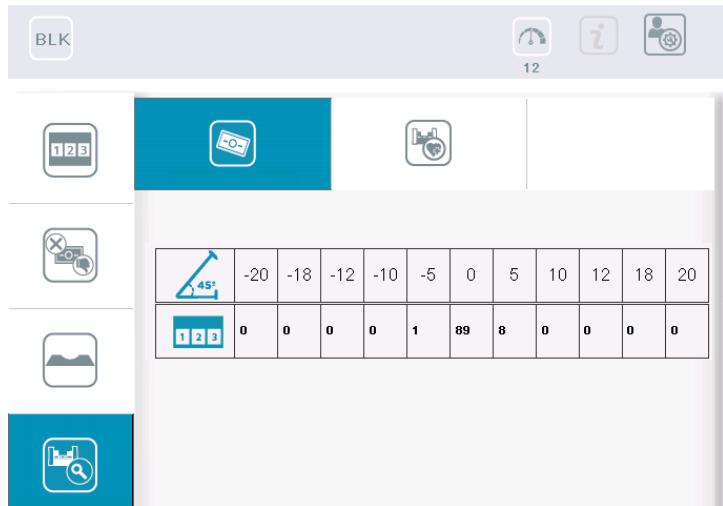


Figure 90: Singler Skew view

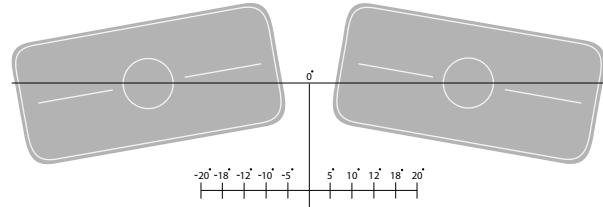


Figure 91: Skew Measurement

The permissible limit of skew is ± 10 degrees.

To adjust the skew, perform fine adjustments of the singler → *Section 6.1.5 “Fine Adjustments of the Singler”, p. 181.*

6.1.2 Basic Adjustments of the Singler

The gap between the singler drum and the retarding rollers should be set equal to the thickness of one banknote so that the singler allows only one banknote to pass through it without any resistance.

If the gap is not set properly, rejects due to closed feed or multiple feed are increased.

Singler gap	Reject reasons
More	Closed feed and multiple items
Less	Missed feed

The singler gap can be set:

- Via singler health option

- Via spring scale

6.1.3 Adjustments Via Singler Health Option

This procedure shows how to set the singler gap via singler health option.

Requirements

- The BPS C5 is switched on.
- Axial adjustment of the retarding wheels assembly is complete.
→ *Section 6.2.1 “Axial Adjustment of the Retarding Wheels”, p. 182*
- Retarding wheels symmetry is adjusted.
→ *Section 6.2.2 “Adjusting the Retarding Wheel Symmetry”, p. 183*
- Singler drum and the hopper wheels is synchronized.
→ *Section 6.3 “Synchronizing the Singler Drum and the Hopper Wheels”, p. 184*
- Service login.
→ *Section 7.2 “Logging in as Service”, p. 200*
- 100 to 200 used banknotes

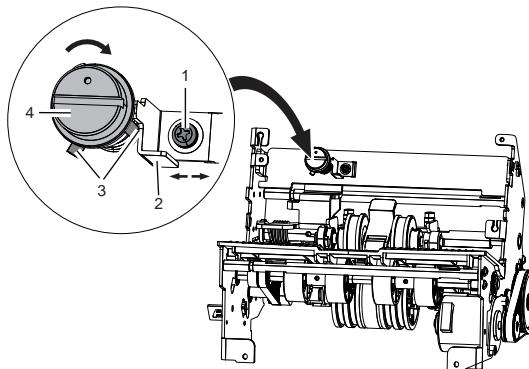
6

Procedure

- [1] Process the banknotes that are not torn or taped.
- [2] See the result to check the singler adjustment status.
→ *Section 6.1.1 “Verifying the Singler Adjustment Status”, p. 173*
- [3] Reduce the singler gap if the closed feed and the multiple feed are high.
- [4] Increase the singler gap if the missed feed is high.

Singler Adjustment Screw Rotation	Result
Clockwise	Increased singler gap
Counterclockwise	Reduced singler gap

Adjusting the Stopper



If the needed position of the singler adjustment screw is outside of the range allowed by the grub screws, adjust the stopper.

- [4-1] Loosen the screw (1).
- [4-2] Move the stopper (2) to your right.
- [4-3] Tighten the screw (1).

**Important!**

Make sure to clear the previous deposit so that the rejects are reset to zero.

⇒ The stopper is adjusted.

- [5] Insert the banknotes into the singler and repeat → [1] to → [4] until the rejects due to closed feed and multiple feed are almost zero.
Make sure to use the same banknotes as before.

**Important!**

If the singler gap is reduced to more than required, there will be an increase in missed feed count and hence affecting the productivity.

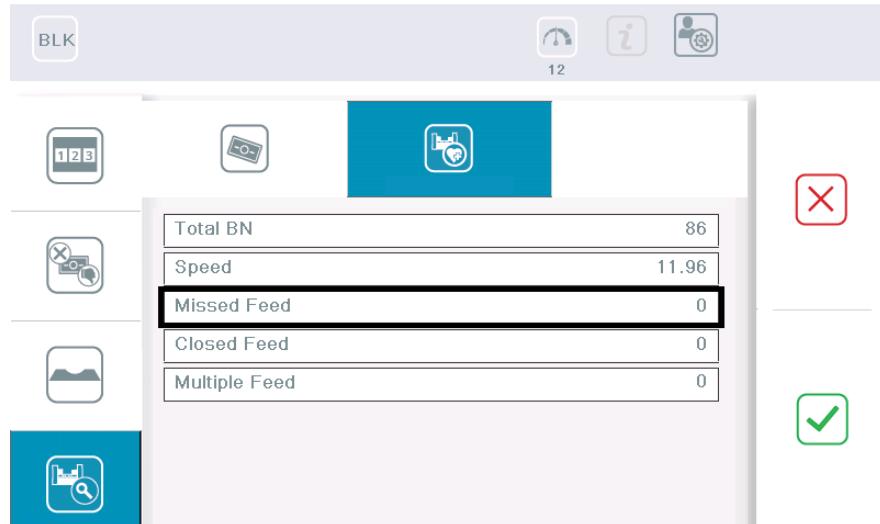


Figure 92: Singler View

Positioning the Singler Adjustment Screw

After the singler is set properly, reposition the singler adjustment screw to 12 O' clock position.

- [5-1] Loosen the two grub screws (3).
- [5-2] Rotate the singler adjustment screw (4) until the indentation (a dot) is in 12 O' clock position.
- [5-3] Tighten the two grub screws (3).
 - ⇒ The singler adjustment screw is positioned.

Result

- ⇒ Basic adjustments of the singler via singler health option is complete.

6.1.4 Adjustments Using Spring Scale

This procedure shows how to set the singler gap using spring scale.

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Requirements

- Axial adjustment of the retarding wheels assembly is complete.
→ *Section 6.2.1 “Axial Adjustment of the Retarding Wheels”, p. 182*
- Retarding wheels symmetry is adjusted.
→ *Section 6.2.2 “Adjusting the Retarding Wheel Symmetry”, p. 183*
- Singler drum and the hopper wheels is synchronized.
→ *Section 6.3 “Synchronizing the Singler Drum and the Hopper Wheels”, p. 184*
- The BPS C5 is not in any banknote processing mode.
- Print fresh quality banknotes

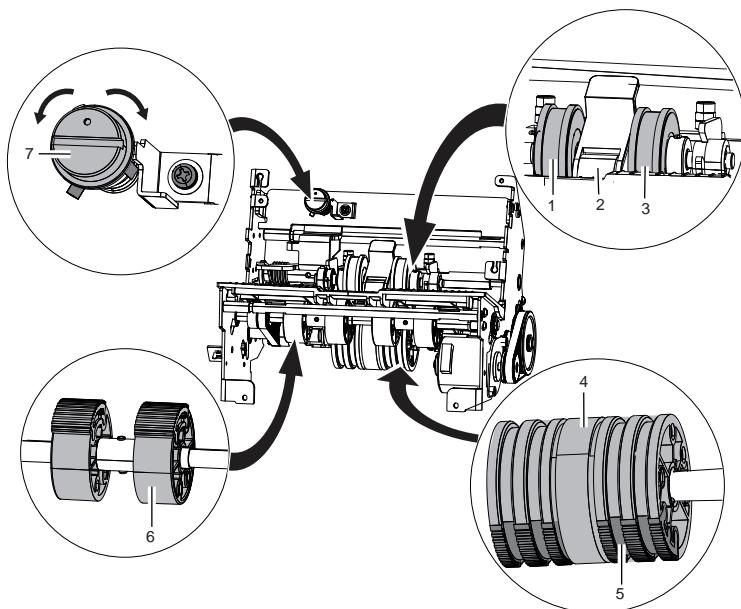


Figure 93: Basic Adjustments of the Singler

Procedure

- [1] Attach a print fresh quality banknote to a spring scale.
- [2] Rotate the hopper wheels assembly (6) to position the friction element (5) on the singler drum (4) away from the retarding wheel (1).
- [3] Insert the banknote into the singler (between the left side of the retarding wheel (1) and the singler drum (4)).
- [4] Rotate the hopper wheels assembly (6) in forward direction so that the banknote is pulled between the friction element (5) and the retarding wheel (1).

**Important!**

Make sure that:

- The banknote does not reach the presser roller (2) and the pinch roller (located at the back of the retarding wheel).
- The Banknote covers the entire width of the friction element (5).

[5] Hold the hopper wheels assembly (6) to restrict the rotation of the singler drum assembly (4).

[6] Drag the spring scale.

[7] Note down the reading on the spring scale when the banknote is just about to slip.

**Important!**

The spring scale should read between 1.0 and 1.5 N at both retarding wheels for effective singling of banknotes.

[8] Rotate the singler adjustment screw (7) to achieve the required frictional force.

Singler Adjustment Screw Rotation	Result
Clockwise	Reduced frictional force
Counterclockwise	Increased frictional force

[9] Perform the same activity with the retarding roller on the right side and note down the spring scale reading.

**Important!**

The force achieved at the retarding roller on the right should be same as that of the retarding roller on the left side.

Result

⇒ Basic adjustments of the singler via singler spring scale is complete.

**Important!**

If there is a variation in the force achieved at the retarding rollers, the singler needs fine adjustments.

6.1.5 Fine Adjustments of the Singler

Fine adjustment of the singler is required if the gap between the retarding rollers (right and left) and the singler drum are not equal. This difference in gap produces skew during the singling of banknotes.

Start this activity with the retarding roller which has greater frictional force.

Requirements

- Axial adjustment of the retarding wheels assembly is complete.
→ *Section 6.2.1 "Axial Adjustment of the Retarding Wheels", p. 182*

- Retarding wheels symmetry is adjusted.
→ *Section 6.2.2 "Adjusting the Retarding Wheel Symmetry", p. 183*

- Singler drum and the hopper wheels is synchronized.
→ *Section 6.3 "Synchronizing the Singler Drum and the Hopper Wheels", p. 184*

- Forces at the retarding rollers is checked.
→ *Section 6.1.4 "Adjustments Using Spring Scale", p. 178*

Procedure

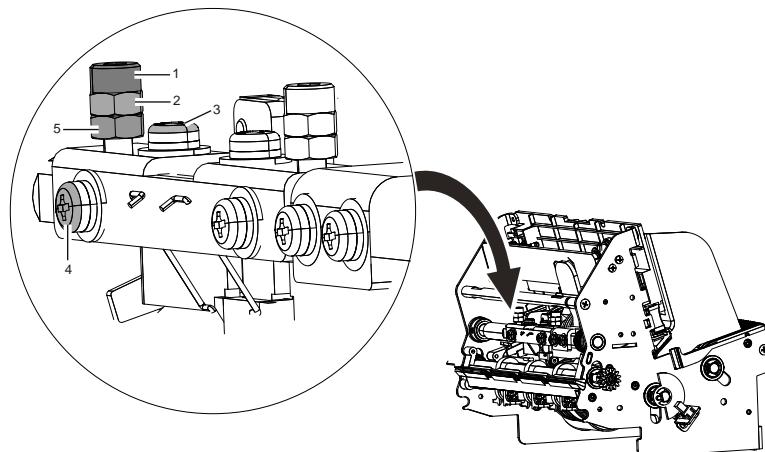


Figure 94: Fine Adjustments



Important!

Start the adjustments with the retarding wheel having greater frictional force.

- [1] Loosen the locknut (2) and (5) holding the screw (1) with an allen key from top.

- [2] Rotate the screw (1) clockwise 2 to 5 degrees depending on the frictional force variation.


Important!

Screw rotation must be limited to multiples of 2 to 5 degrees.

- [3] Check the frictional force again using spring scale.
- [4] Repeat steps → [2] to → [3] until the frictional force is equal at the retarding roller on the other side.

If the required frictional force is achieved

- [5] Hold the screw (1) with an allen key and tighten the locknut (5).

- [6] Tighten the locknut (2).

Result

- ⇒ Fine adjustment of the singler is complete.

6

6.2 Adjusting the Retarding Wheels

6.2.1 Axial Adjustment of the Retarding Wheels

This adjustment is made in the retarding wheels assembly to restrict axial movement of the retarding rollers along its shaft to 0.1 mm.

Requirements

- The singler module is removed from BPS C5.
- Feeler gauge of 0.1 mm.

Procedure

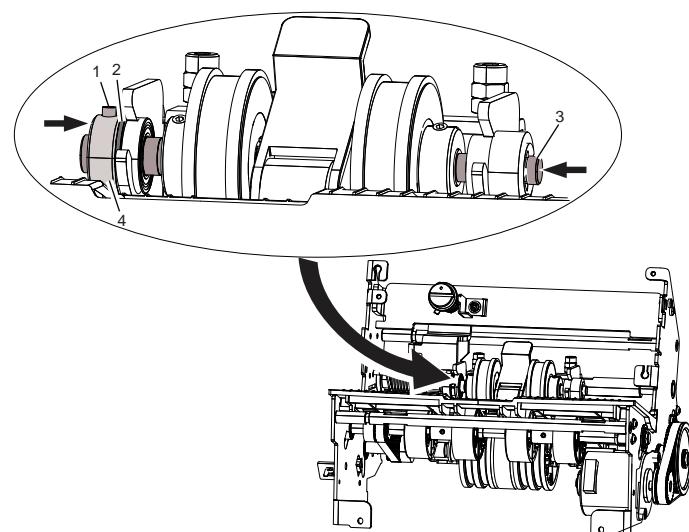


Figure 95: Axial Adjustment

- [1] Loosen the grub screw (1).
- [2] Insert a feeler gauge of 0.1 mm between the brass collar (4) and the washer (2).
- [3] Press gently the brass collar (4) and the retarding wheel shaft (3) together.
- [4] Tighten the grub screw (1).
- [5] Remove the feeler gauge from the singler area.
- [6] Repeat step → [2] and check if a gap of 0.1 mm is maintained between the brass collar (4) and the washer (2).

If the axial movement of the retarding wheels is not 0.1 mm

- [7] Repeat steps → [1] to → [6].

Result \Rightarrow Axial adjustment of the retarding wheels is complete.

6.2.2 Adjusting the Retarding Wheel Symmetry

This adjustment is made in the retarding wheels assembly to set symmetry of the retarding rollers to the singler drum.

Requirements

- The singler module is removed from BPS C5.
- Axial movement of the retarding wheels is restricted to 0.1 mm.
→ *Section 6.2.1 "Axial Adjustment of the Retarding Wheels", p. 182.*

Procedure

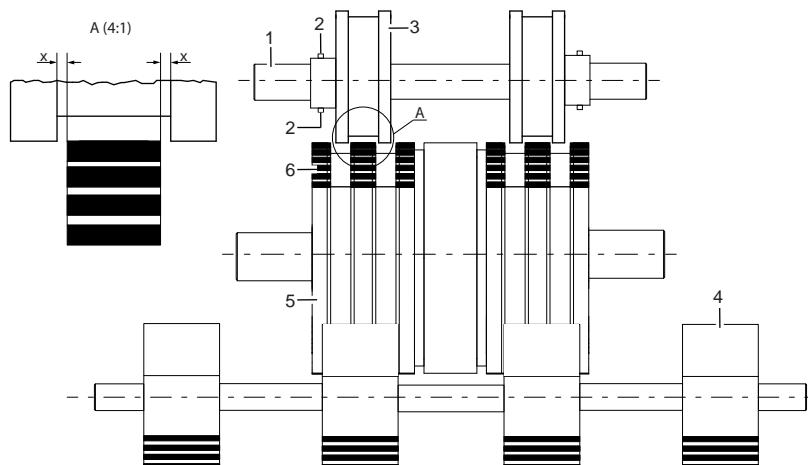


Figure 96: Setting the Retarding Wheels Symmetry

- [1] Rotate the hopper wheels (4) such that the friction elements (6) of the singler drum (5) are facing the retarding roller (3).
- [2] Check if the gaps (X) are equal.

If the gaps (X) are not equal

- [3] Loosen the two grub screws (2).
- [4] Shift the retarding roller (3) along the shaft (1) until the gaps (X) are equal.
- [5] Tighten the two grub screws (2).

If the gaps (X) are equal

- [6] Perform the same activity with the other side of the retarding wheel.

Result

- ⇒ Symmetry of the retarding wheels is set.

6.3 Synchronizing the Singler Drum and the Hopper Wheels

Synchronization of the singler drum and the hopper wheels is necessary for efficient singling of banknotes.

Asynchronous rotation of the singler drum and the hopper wheels results in missed feed.

Requirements

Removing the Belt

- The singler module is removed from BPS C5.

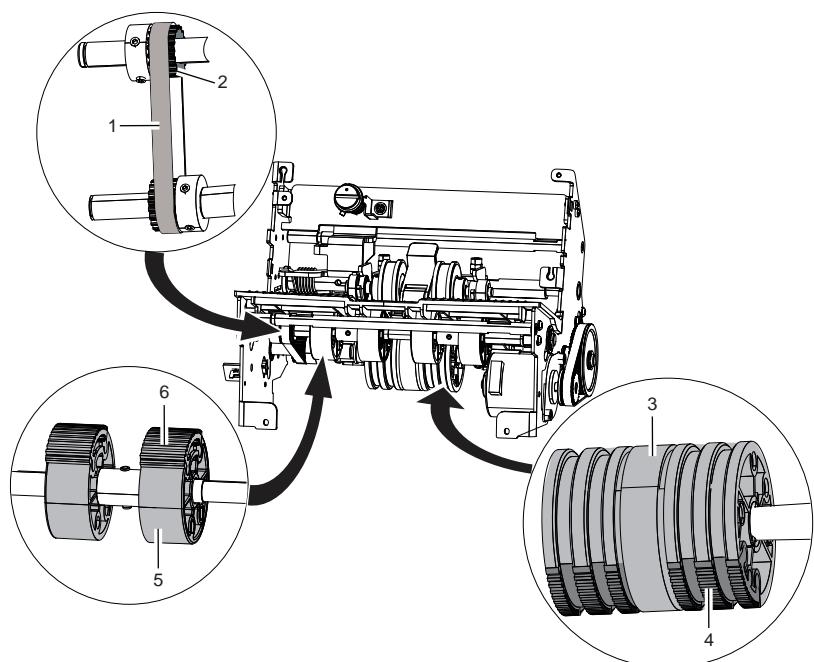
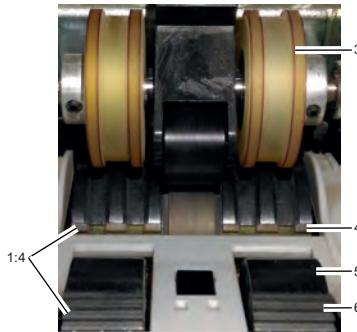


Figure 97: Removing the Belt

- [1] Remove the toothed belt (1) from the toothed belt wheel (2).

Singler Drum and Hopper Wheels Ratio

- [2] Adjust by rotating the singler drum (3) and the hopper wheels (5) to 1:4 ratio.



Singler drum	First row of the friction element (4) is visible.
Hopper wheels	First four rows of the friction elements (6) are visible.

- [3] Hold the singler drum (3) and the hopper wheels (5) with one hand.
- [4] Mount the toothed belt (1) onto the toothed belt wheel (2).
- [5] Check if the synchronization of the singler drum and the hopper wheels is not disturbed.
- [6] If the synchronization is disturbed, repeat steps → [1] to → [4] until correct ratio of the wheels is achieved.

Result

- ⇒ Synchronization of the singler drum and the hopper wheels is complete.

6

6.4 Stacker Synchronization

The stacker synchronization process consists of two steps:

- Aligning the stacker wheel and the encoder
 - *Section 6.4.1 “Aligning the Stacker Wheel and the Encoder”, p. 186*
- Stacker motor assembly test
 - *Section 6.4.2 “Stacker Motor Assembly Test”, p. 189*

6.4.1 Aligning the Stacker Wheel and the Encoder

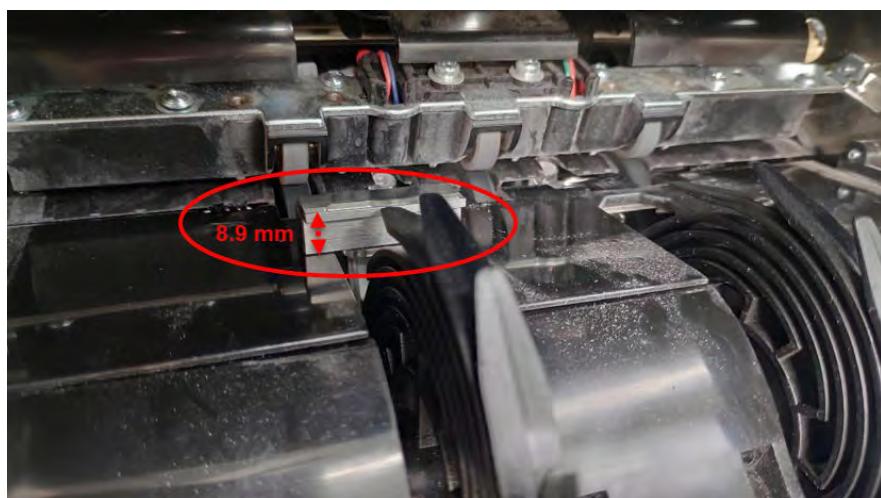
Requirements

- The BPS C5 switched off.
Secure the BPS C5 so that it cannot be switched on again.
→ *Section 5.1.1 “Switching BPS C5 On and Off”, p. 63*
- The stacker wheel assembly retrofit kit installed
→ *Section 5.3.4 “Installing the Stacker Wheel Assembly”, p. 103*
- The IM opened
→ *Section 5.1.2.1 “Opening Input Module (IM)”, p. 65*
- Bevel gear adjusted properly
→ *Section 6.4.3.1 “Reducing Stacker Wheel to Bevel Gear Play”, p. 191*
- No horizontal play in the stacker wheel
→ *Section 6.4.3.3 “Reducing Horizontal Play in Stacker Wheel”, p. 194*
- No play between the stacker wheel shaft and encoder disk
→ *Section 6.4.3.2 “Reducing Stacker Wheel to Encoder Disk Play”, p. 193*
- Software version 4.1.3 or above installed in the BPS C5
→ *Section 7.14 “Updating the Software Manually”, p. 236*

6

Procedure

- [1] Place the stacker alignment block on guide plate 10. The height of the stacker alignment block is 8.9 mm, which is the required height difference between the tip of the petal and the guide plate 10. The block acts the reference to the correct height.



- [2] Align the petal tip of the stacker wheel to the block.

**Important!**

Ensure that the height difference between the tip of the petal and the guide plate 10 is 8.9 mm. The petal tip must not be below the 8.9 mm height. It would still work in case it is a little higher.

To achieve this, the petal tip and the stacker alignment block should be on the same level .

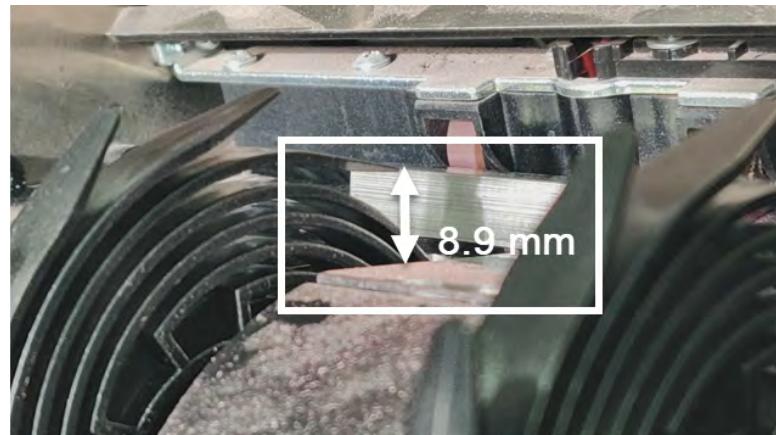
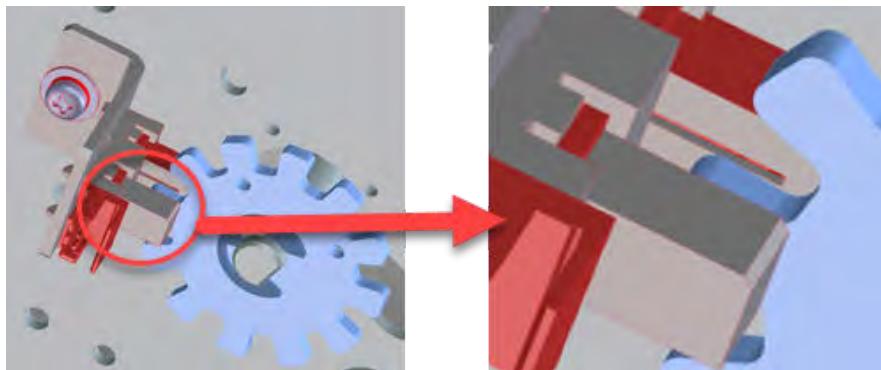


Figure 98: Setting the Petal Tip Height

Once you set the petal tip at this position, do not move the stacker wheel any further.

- [3] Switch on the BPS C5.
- [4] Log in as service.
→ *Section 7.2 “Logging in as Service”, p. 200*



- [5] Adjust the PD to achieve the correct position.
To adjust the PD, move the PD bracket slightly in the counter clockwise direction .

**Important!**

The correct position is achieved when the encoder just cuts the PD at the transition point and the LED lights up.

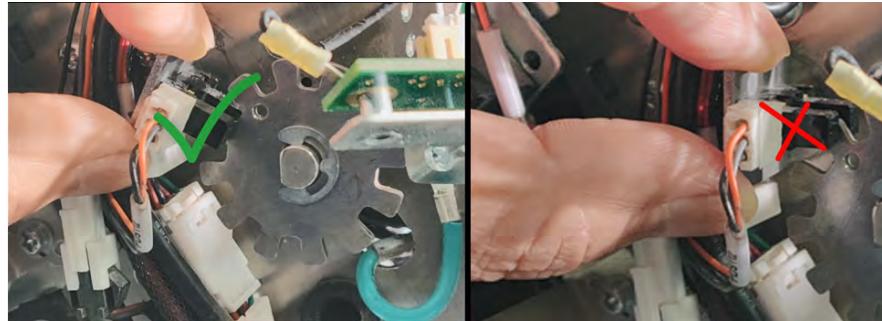
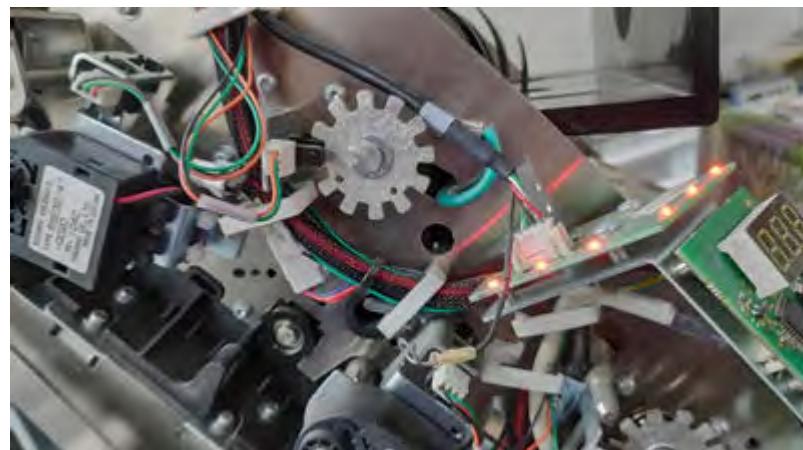


Figure 99: Correct Position of the Encoder

Once the correct position is achieved, do not move stacker wheel or encoder and the PD bracket.

- ⇒ The LED starts glowing as soon as the correct position is achieved for the encoder.



[6] Tighten the screw of encoder PD bracket at this position.

[7] Verify if the stacker wheel petal is leveled with 8.9 mm block and encoder is at correct position with PD.

Result

⇒ The stacker wheels are aligned.

Perform the stacker motor assembly test to complete the stacker synchronization.

→ *Section 6.4.2 “Stacker Motor Assembly Test”, p. 189*

6.4.2 Stacker Motor Assembly Test

Stacker motor assembly test is performed to verify if the stacker motor is functioning as desired. The BPS C5 runs the stacker motor assembly test during .

At the end of the , individual stacker LED shows the result of stacker motor assembly test.

LED Color	Description	Action
Green	Stacker motor assembly test is passed. The stacker synchronization is complete	
Red	Red LED implies either of the following scenario: <ul style="list-style-type: none">● Encoder PD not functioning as desired.● Stacker motor assembly test has failed.	Verify the stacker synchronisation and take actions accordingly. → <i>Section 6.4.3 “Verifying the Stack Synchronization”, p. 189</i>
White	White LED implies either of the following scenario: <ul style="list-style-type: none">● Bevel gear adjustment incorrect● Horizontal play in the stacker wheel	
Blue	Play between the encoder disk and the shaft	

6.4.3 Verifying the Stack Synchronization

→ *Section 6.4.2 “Stacker Motor Assembly Test”, p. 189*

Requirements

- The BPS C5 switched on
- The stacker wheel retrofit kit installed

→ *Section 5.3.4 “Installing the Stack Synchronization”, p. 103*

Procedure

- [1] Log in as .

- [2] Perform .
- [3] Check the LED status of the individual stacker.
 → *Section 6.4.2 “Stacker Motor Assembly Test”, p. 189*
 ⇒ The stacker motor assembly test is successful if the LED status is green. The stacker synchronisation is complete.
 If the LED status is red, proceed to step 4 to check the encoder signal.
 If the LED status white or blue, proceed to step 7.

Checking the Encoder Signal

6

- [4] Log out from the menu.
- [5] Log in as again.
- [6] Rotate the wheel, for every block/unblock encoder cut.
 ⇒ If the stacker LED alternatively changes between On/Off state, proceed to step 7.
 If the LED status does not change alternatively, this means that the encoder PD is not functioning as desired. Replace the encoder PD or the PD cable, if required.
- [7] Check if there is any play between the stacker wheel to bevel gear.
 → *Section 6.4.3.1 “Reducing Stacker Wheel to Bevel Gear Play”, p. 191*
 ⇒ If there is no play in the other bevel gear, proceed to step 8.
 If the bevel gear moves, reduce stacker wheel to bevel gear play.
- [8] Check if there is play between the stacker wheel and encoder disk.
 → *Section 6.4.3.2 “Reducing Stacker Wheel to Encoder Disk Play”, p. 193*
 ⇒ If there is no play in the encoder, proceed to step 9.
 If you notice play, reduce stacker wheel to encoder disk play.
- [9] Check if there is any horizontal play in the stacker wheel.
 → *Section 6.4.3.3 “Reducing Horizontal Play in Stacker Wheel”, p. 194*

- Result ⇒ Once the LED status is green, the stacker synchronisation is successful.
Assemble the BPS C5.
The BPS C5 is ready for operation.

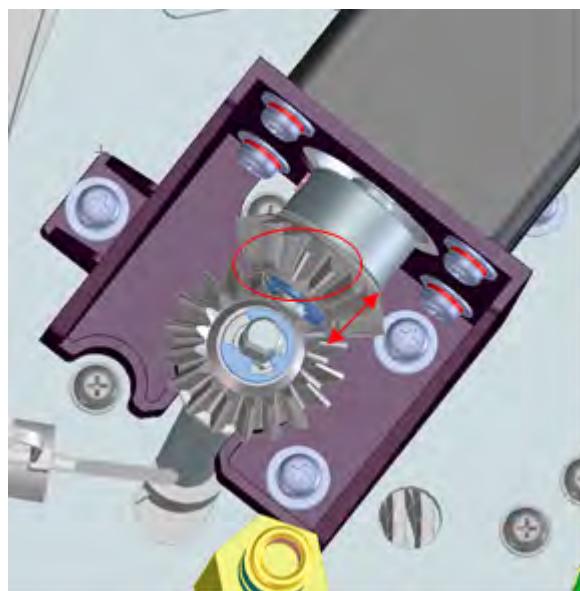
6.4.3.1 Reducing Stackter Wheel to Bevel Gear Play

The stackter wheel should be without play when bevel gear is blocked, but smoothly turning. To detect play in the encoder, hold the stackter wheel tightly and try to move the bevel gear.

→ p. 190

Checking the Bevel Gear Play

- [1] Hold the vertical bevel gear, and move the corresponding stackter wheel.
The stackter wheel should not move more than one degree.
⇒ If the stackter wheel moves more than one degree,, reduce stackter wheel to bevel gear play.



- [2] Check the bevel gear by moving it back and forth in the highlighted direction.
There should not be any play.
Repeat this step for multiple teeth rotation.
⇒ If the bevel gear moves, reduce stackter wheel to bevel gear play.

Reducing the Play

- [3] Loosen the grub screw.

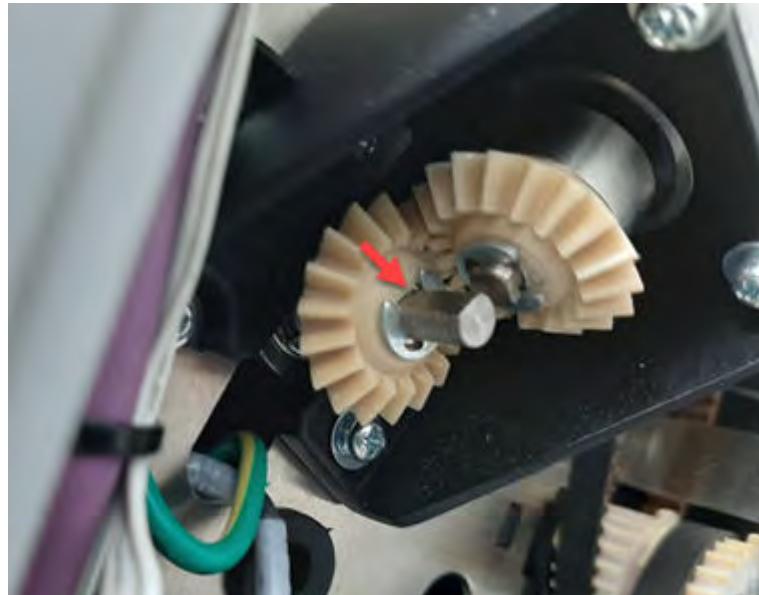
6

- [4] Adjust the bevel gear along the shaft by pulling it downwards.

- [5] Tighten the grub screw highlighted in the image below.



- [6] If you notice gap between the lower bevel gear and the shaft:



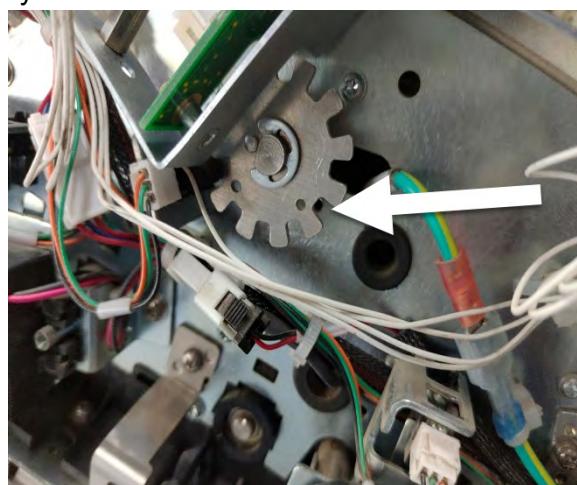
- [6-1] Remove the retaining washer.
- [6-2] Add a drop of glue (article no: - 192328000) in the shaft.
- [6-3] Re-install the retaining washer.

Result \Rightarrow The play of the stacker wheel to bevel gear is reduced.

6.4.3.2 Reducing Stackter Wheel to Encoder Disk Play

\rightarrow p. 190

Checking the Encoder Disk Play



- [1] Hold stacker wheel and try to move corresponding stacker encoder disk.

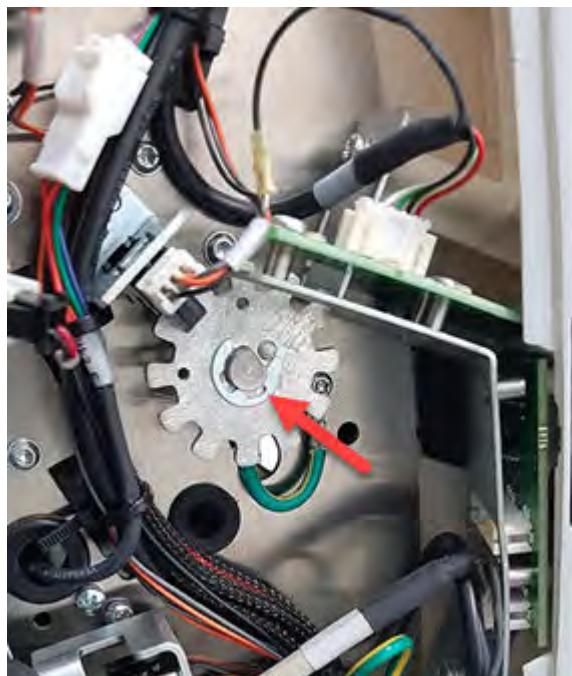
There should not be any movement in:

- Clockwise/anticlockwise direction
- Back and forth direction

⇒ If you notice play, reduce stacker wheel to encoder disk play.

Reducing the Play

- [2] Remove the retaining washer.



- [3] Add a drop of glue (article no: - 192328000) in the shaft.
Ensure that the D-cut is aligned with the flat portion of the axis and then add the glue.

- [4] Re-install the retaining washer.

Result ⇒ The stacker wheel to encoder disk play is reduced.

6.4.3.3 Reducing Horizontal Play in Stackter Wheel

→ Section 6.4.2 “Stacker Motor Assembly Test”, p. 189

Procedure



- [1]** Hold the stacker wheel and try to move it in horizontal direction.
- [2]** Check if there is any play between the stacker wheel and the shaft.
⇒ If you notice any play, add one drop of glue (article no: - 192328000) in the shaft to eliminate the play.
- [3]** Check if there is any play between the shaft and the chassis.
⇒ If you notice any play, add one drop of glue (article no: - 192328000) in the chassis to attach the inner side of the bearing of the shaft .

**Important!**

Ensure that the necessary movement is not affected.

Result

⇒ The horizontal play in the stacker wheel is resolved.

6

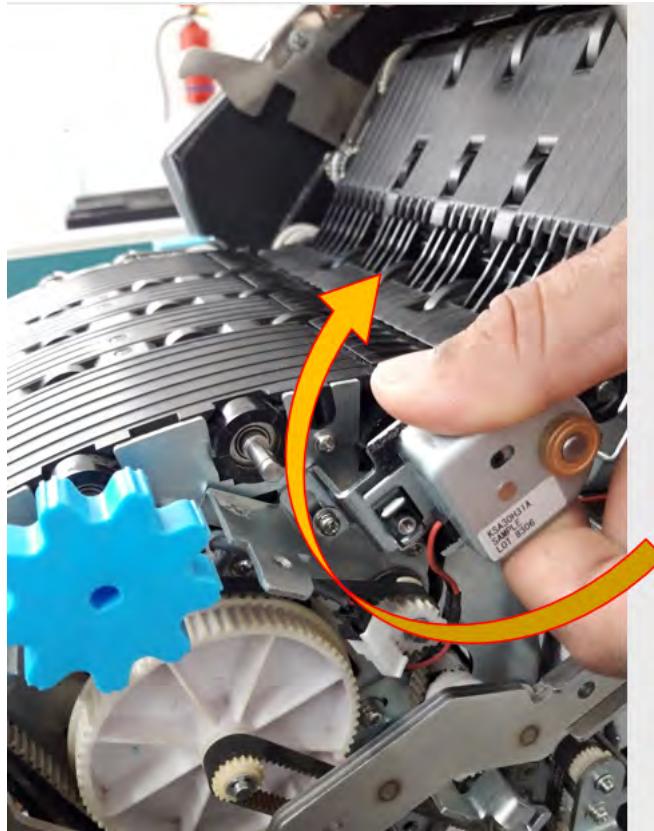
6.5 Adjusting the Solenoid Assembly

Requirements

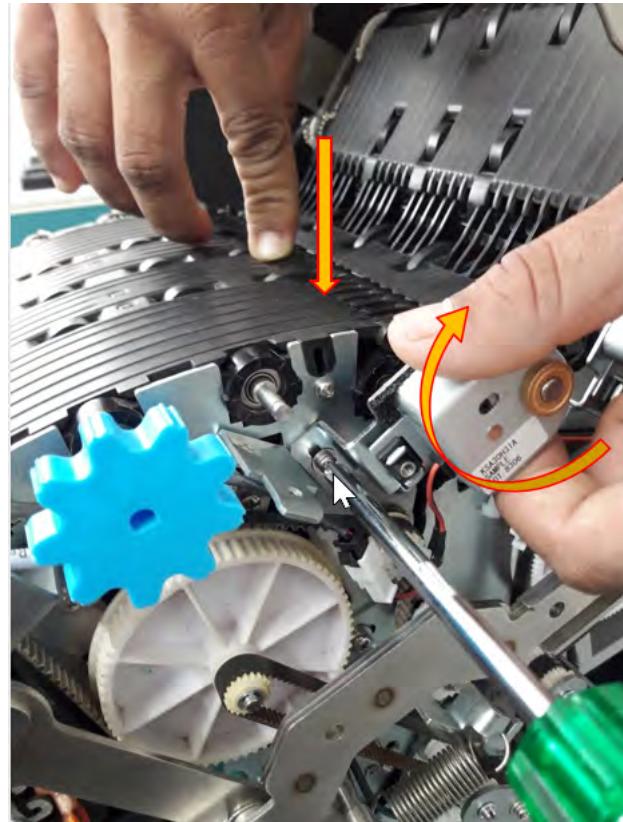
- The BPS C5 switched off
- The BPS C5 opened
- Two trained personnel to perform the adjustment

Procedure

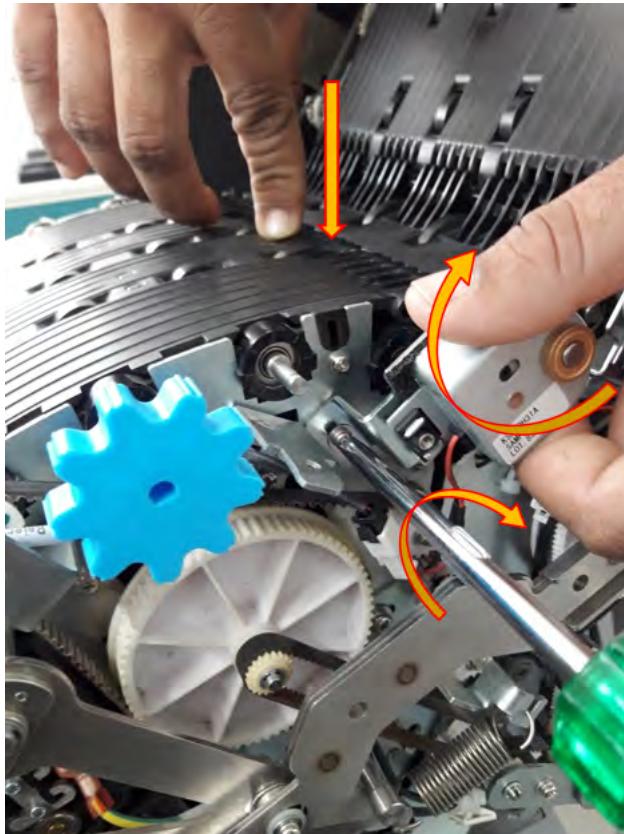
6



- [1] Rotate the solenoid assembly gently in the clockwise direction.
To achieve the correct orientation, keep rotating the solenoid assembly until the internal end stop is hit.



- [2] Keeping the solenoid in relative angle with respect to diverter rod, push the diverter fingers gently on the top so that they are pressed against noise dampening pads.



- [3] Having one technician keeping solenoid assembly and diverter fingers stable in the place, tighten the screw to maintain position of parts as per specification.
The screw must be tightened by the second technician to ensure the solenoid and the diverter assembly are stable.

**Important!**

Make sure the relative position of solenoid and diverter fingers does not change during step 3.

This step needs must be performed carefully by trained technicians as this outcome of this step can affect the to banknote processing and noise levels.

7 Software

This section describes the service functions of the BPS C5 that can be accessed via the service menu.

The service menu provides options to test various functional units directly, and acts as an interface for starting service and diagnostic functions.

7.1 User Interface

The BPS C5 has three user types:

- Operator:
Performs banknote processing and related operations.
- Supervisor:
Performs various system administration operations.
- Service:
Performs the service-related tasks.

When you start the BPS C5, the login screen is launched.

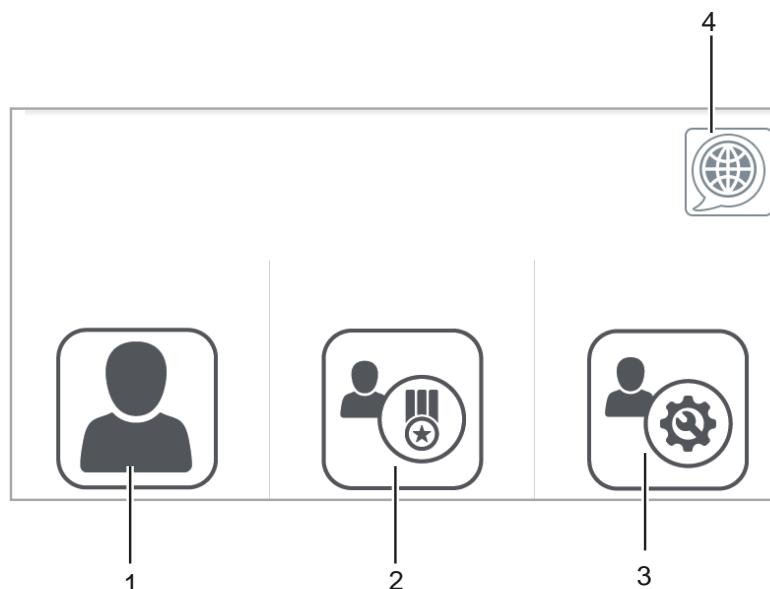


Figure 100: Main Screen

- 1 Operator
To log in as an operator.
- 2 Supervisor
To log in as a supervisor.

- 3 Service
To log in as service engineer.
- 4 Language
To set the language.

An overview of all the symbols can be found in the Appendix.
 → *Chapter I “Symbols Used”, p. 299*

7.2 Logging in as Service

You must be logged in as service to carry out any service-related tasks. There is only one service ID set up in the default configuration. The default PIN for service login is 2001.

When you select the service login, you are prompted to enter your service PIN.

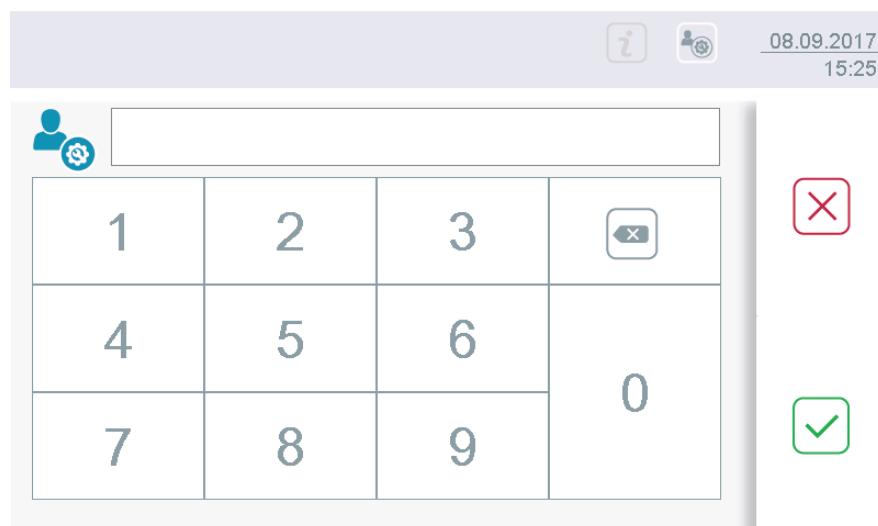
Only one user may be logged in to the BPS C5 at any time. If an operator is logged in, then first close all deposits and log off as an operator.

This procedure shows how to log in as a service engineer.

- The BPS C5 is switched on.
 → *Section 5.1.1 “Switching BPS C5 On and Off”, p. 63*

Procedure

- [1] In the login screen, select .



- [2] Enter the service PIN.

- [3] Select
- Result ⇒ You have successfully logged in to service.

7.3 Service Menu



NOTICE

Risk of loss of data or settings

In the service menu, improper use can result in loss of data or settings.

Work secure and follow the instructions properly.

In the service menu, there are three screens with the following menu options. You can scroll from one screen to another by swiping.

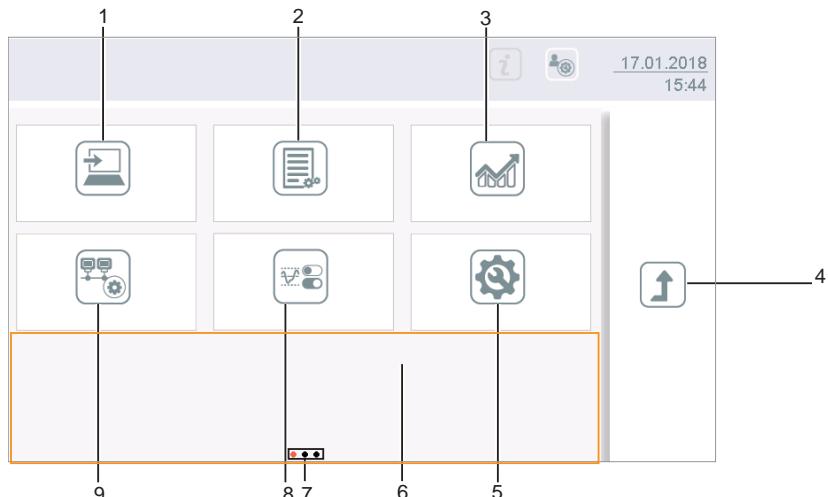


Figure 101: Service Menu Screen 1

- 1 Software Versions
Displays the software version.
- 2 Reporting
Prints report or transfers reports to FTP or USB stick.
- 3 Operation Details
Displays various operation details.
- 4 Back
Navigates to the login screen.
- 5 Service OPmode
Interfaces various service and diagnostic functions.

- 6 Swipe area
Scrolls from one screen to another.
- 7 Screen indicator
Indicates the screen when scrolling from one screen to another. The red dot indicates the current screen status.
- 8 Fitness Threshold Settings
Sets the sorting thresholds for fitness sorting.
- 9 IRT Settings
Configures the IP address of the IRT server.

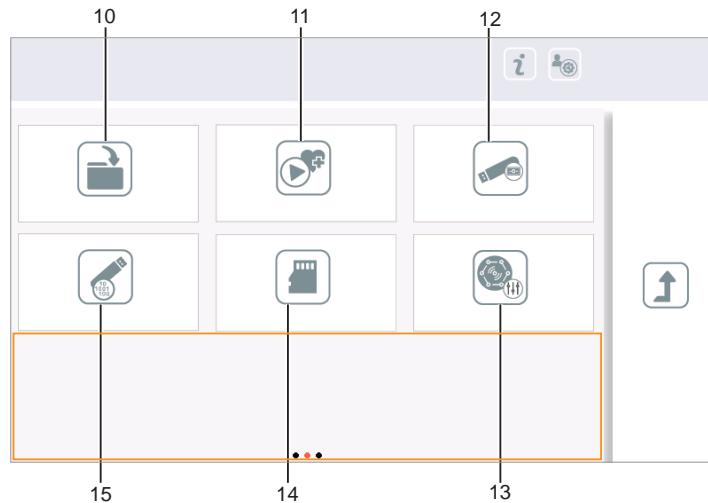


Figure 102: Service Menu Screen 2

- 10 SW Update
Updates/install the software, configuration package, or language software.
- 11 System Test
Checks the health of the machine components.
- 12 Dump logs
Creates troubleshooting traces and logs, and transfers the logs to a USB stick.
- 13 Self-Test Level Setting
Sets the self-test level.
- 14 SD Backup
Takes data backup on SD card.
- 15 Export Raw data
Exports raw data of the last 100 processed banknotes to the USB stick.

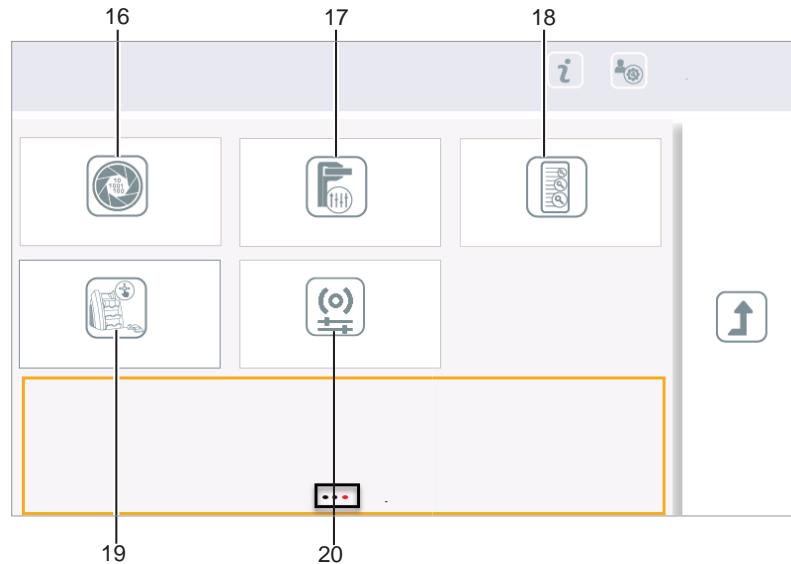


Figure 103: Service Menu Screen 3

16 Raw Data Capturing

Connects IRT to capture raw data of a particular currency.

17 MTS Calibration Update

Updates the calibration file after MTS calibration.

18 Trace Level Setting

Sets the trace level parameters.

19 Configure Virtual PD

→ *Section 7.22 “Configuring the Virtual Photo Detectors”, p. 263*

7.4 Service OP Modes

The  menu provides the following options:

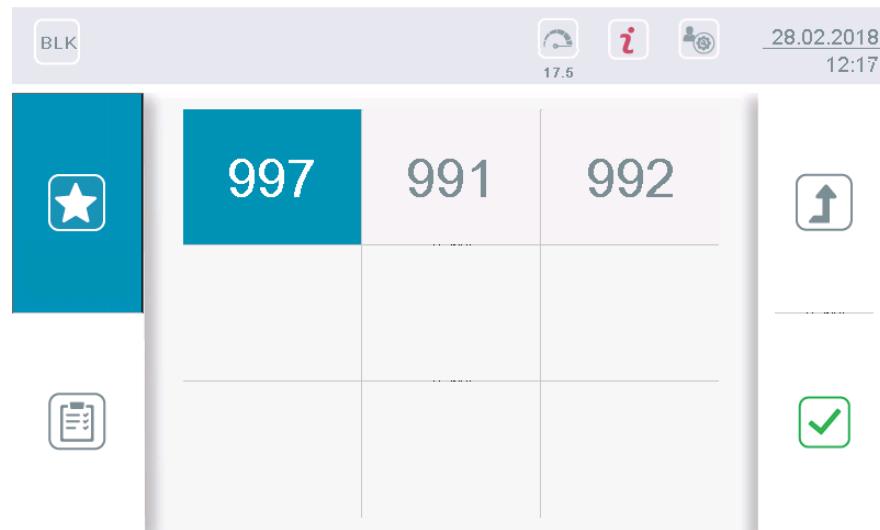


Figure 104: Service OP Modes

OP Code	Operation	Description
997	Service Mode	Process the document to check the transport and singler health status → <i>Section 7.8 “Testing the BPS C5 Transport and Singler Health”, p. 210</i>
991	MTS Calibration Mode	Process the MTS calibration media to calibrate the MTS sensor. → <i>Section 7.9 “Calibrating the Sensor - MTS (Mechanical Thickness Sensor)”, p. 212</i>
992	Sensor Functional Test	Process the sensor function test media (FUKO) to sensors functional test. → <i>Section 7.10 “Testing the Sensor (Functional Test)”, p. 215</i>

7.5 Viewing the Software Version Details

You can view the software versions details of the installed components.

Requirements

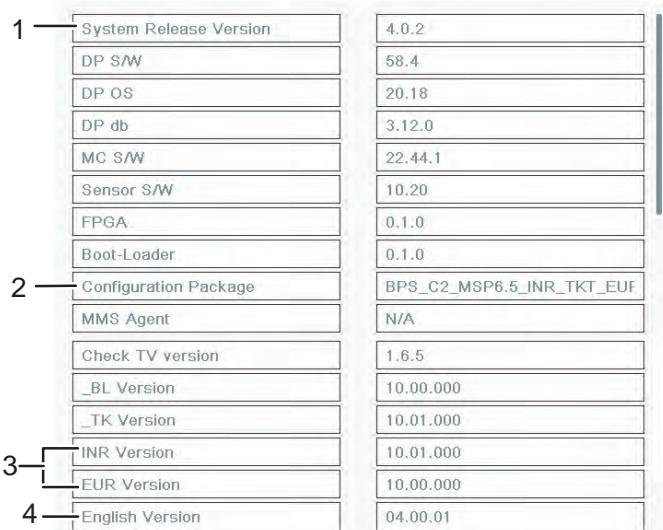
- Service login
→ *Section 7.2 “Logging in as Service”, p. 200*

Procedure

- [1] Select .

Result

⇒ The software version details are displayed.



1	System Release Version	4.0.2
	DP S/W	58.4
	DP OS	20.18
	DP db	3.12.0
	MC S/W	22.44.1
	Sensor S/W	10.20
	FPGA	0.1.0
	Boot-Loader	0.1.0
2	Configuration Package	BPS_C2_MSP6.5_INR_TKT_EUF
	MMS Agent	N/A
	Check TV version	1.6.5
	_BL Version	10.00.000
	_TK Version	10.01.000
3	INR Version	10.01.000
	EUR Version	10.00.000
4	English Version	04.00.01

Figure 105: Software Version Details

- 1 System software version
- 2 Configuration package name
- 3 Currency package version
- 4 Language package version

Use the scroll bar to view the version information of rest of the currencies.

7.6 Printing/Sending/Copying Report

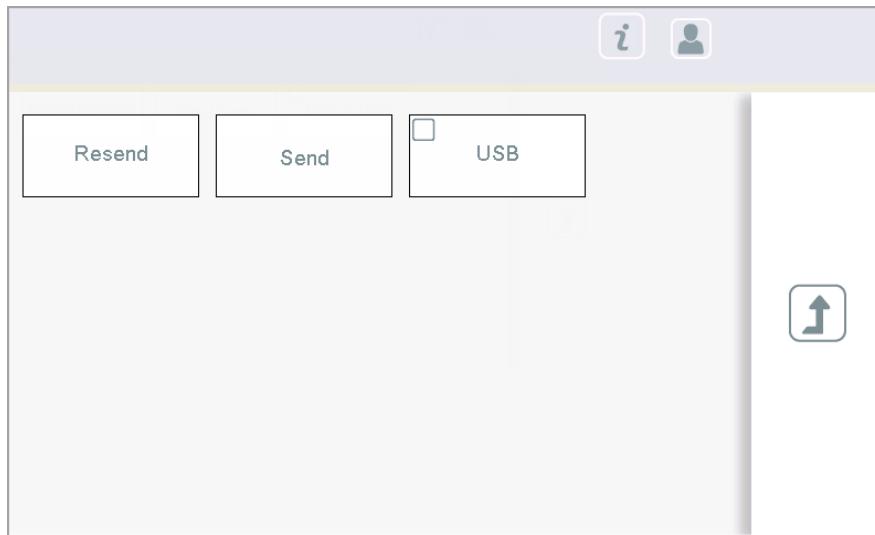


Figure 106: Reporting Menu

The **Reporting** menu, available in all the logins, provides the following options:

- Print/Send: The **Print Reports** menu option provides the list of reports, which are triggered by a user request. User trigger is available on the following reports:
 - Daily Balance Report
 - Operator Report
 - Reject Report
 - Service Report
 - Version Report
 - Machine Balance Report
 - Deposit Balance Report
 These reports are displayed in **Reporting** menu as configured in the configuration package. You can print the reports manually.
→ Section 7.6.1 “Manually Printing/ Sending Reports”, p. 207
- Reprint/Resend: The **Reprint Reports** menu option provides the list of reports, which have been already printed/sent to any target or missed in printing/sending due to the unavailability of target or any other reason. You can print/send the reports again from here.
→ Section 7.6.2 “Reprinting/Re-sending Reports”, p. 208
- Copy to USB: The **USB** menu option allows you to copy any report to the USB stick. Use this option if you have not configured the USB target for reports, and you need a report in USB.

A copy of the reports are copied in the *USB* folder of the USB drive.

→ *Section 7.6.3 “Copying Reports to USB Stick”, p. 208*

The list of available reports in the above menu options depends upon the configuration settings.

Reports can be printed/sent manually using:

- **Reporting** menu
- HotKey 

The list of printable reports for a particular user depends upon the configuration settings. Applicable for following print reports either Deposit balance can be triggered or daily balance

Based on the configured package, either of the following reports can be printed using  :

- Deposit balance report (priority 1)
- Daily balance report (priority 2)

The daily balance report has priority two, which means if both deposit balance report and daily balance report are configured with user request trigger, only the deposit balance report will be printed. If not deposit balance report is not configured, then only the daily balance report (if configured) will be printed. If none of the reports are configured, the following error message will appear when

 is pressed:

The report is not configured

7

7.6.1 Manually Printing/ Sending Reports

→ *Section 7.6 “Printing/Sending/Copying Report”, p. 206*

Requirements

- Printer connected
- FTP address configured

Procedure

[1] Log in.

→ *Section 7.2 “Logging in as Service”, p. 200*

- [2] Select 
- [3] Select **Send**.
- [4] Select the desired report.
- [5] Select 
- Result ⇒ The report is printed/sent.

7.6.2 Reprinting/Re-sending Reports

→ *Section 7.6 “Printing/Sending/Copying Report”, p. 206*

- Requirements
- Printer is connected.
 - FTP is configured.

Procedure

- [1] Log in.
→ *Section 7.2 “Logging in as Service”, p. 200*
- [2] Select 
- [3] Select **Resend**.
- [4] Select the desired report.
- [5] Select 
- Result ⇒ The report is reprinted/resent.

7.6.3 Copying Reports to USB Stick

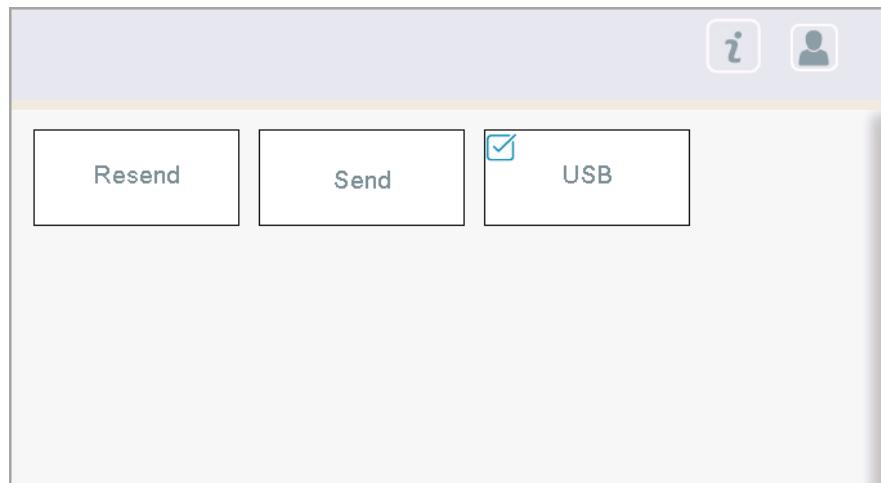
→ *Section 7.6 “Printing/Sending/Copying Report”, p. 206*

- Requirements
- The USB stick is plugged into the BPS C5.

Procedure

- [1] Log in.
→ *Section 7.2 “Logging in as Service”, p. 200*
- [2] Select 

[3] Check the **USB** check box.



[4] Select 

Result

⇒ You have successfully enabled the Copy to USB function.
A copy of the configured report is copied to the USB stick.

7

7.7 Viewing Operation Details

You can view the details of various operations to understand the system info, health, life, and performance. This procedure shows how to view operation details.

Requirements

- Service login
→ *Section 7.2 “Logging in as Service”, p. 200*

Procedure

[1] Select 

Result

⇒ The following screen displays the operation details.



Figure 107: Operation Details Screen

Scroll down the screen for more operation details.

Select the  button to reset the resettable values.

7.8 Testing the BPS C5 Transport and Singler Health

7

You can process the blank banknotes to test the BPS C5 transport and the singler health status using the menu.

The BPS C5 transport and the singler health status is usually tested after any preventative maintenance task.

The BPS C5 takes the format and thickness of the first singled banknote as reference. The banknotes are sorted alternately to the delivery stackers.

The banknotes, which do not match the reference, are sorted to the reject stacker.

The OP mode **997** is used.

This procedure shows how to test the BPS C5 transport and singler health.

Requirements

- Service login
→ *Section 7.2 “Logging in as Service”, p. 200*
- Blank banknotes

Procedure

- [1] Select .
- [2] Select the **997** OP mode.
- [3] Insert the blank banknotes into the singler.

⇒ The blank banknotes are singled and sorted in the delivery stackers 1 and 2.

The view displays the count of the sorted banknotes.

[4]

Select

⇒ The **Reject** view displays the reject reasons.

If the banknotes are rejected for any reason, other than **Configuration**, the mechanical properties and the sensor health should be analyzed.

[5]

Select

⇒ The view displays the number of banknotes in each delivery stacker for the current accounting, and the total number of banknotes in each delivery stacker.

[6]

Select

⇒ The tab displays details on skew and health of the singler.

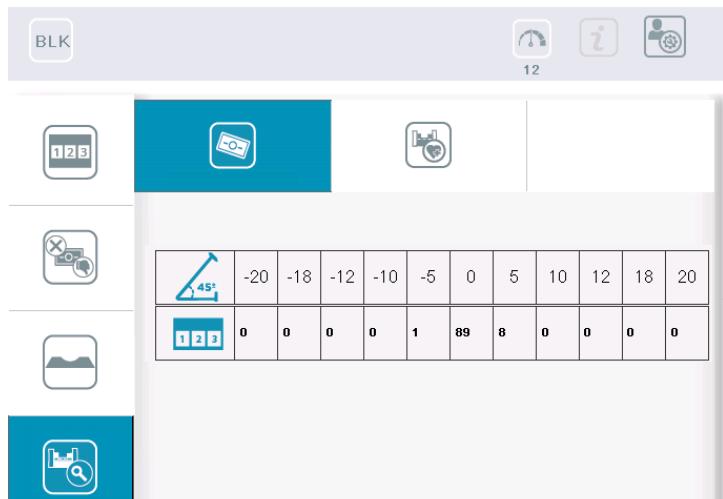


Figure 108: Skew View

+ indicates clockwise skew.

- indicates anticlockwise skew.

The acceptable range of skew is +10 to -10. However, the number of banknotes should be higher around 0 degrees to indicate that the singler is set correctly.

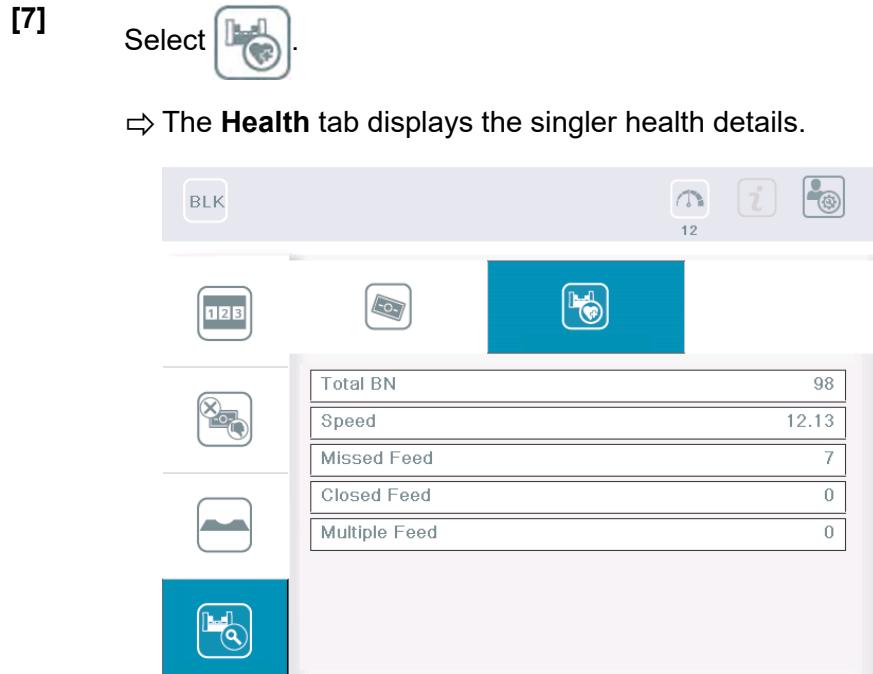


Figure 109: Singler Health View

The higher number of closed feed, missed feed, and multiple feed rejects indicate that the singler is not adjusted correctly.

Result ⇒ The transport and singler health properties are tested.

7.9 Calibrating the Sensor - MTS (Mechanical Thickness Sensor)

The MTS (mechanical thickness sensor) of the BPS C5 can be calibrated in the field using the service OP mode **991** and the **MTS** menu option.

You should perform MTS calibration after changing any parts related to the MTS sensors.

This procedure shows how to calibrate the MTS.

Requirements

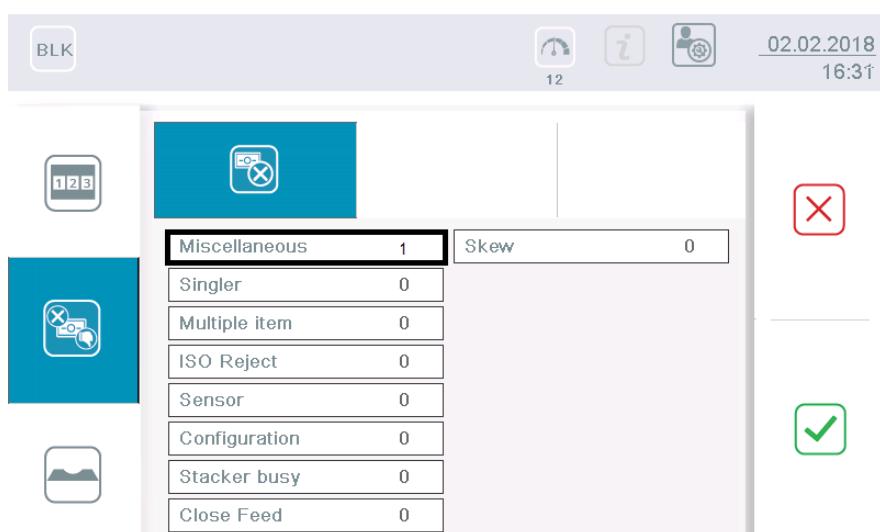
- PC with administrative rights
- The BPS C5 switched on
→ *Section 5.1.1 “Switching BPS C5 On and Off”, p. 63*
- USB stick
- Calfilebuilder tool installed on the PC
→ *Section 4.2 “Software Tools”, p. 59*
- Service login
→ *Section 7.2 “Logging in as Service”, p. 200*
- MTS Calibration document (Art.-No.: 514867001)

Generating Raw Data for MTS Calibration Media

[1] Select .

[2] Select the **991** OP mode.

[3] Insert one calibration document into the singler.
The document is processed and sent to the reject stacker.
The result is displayed.



[4] Select the  tab.

The reject reason must be miscellaneous.

If the reject reason is not miscellaneous, repeat → [3].

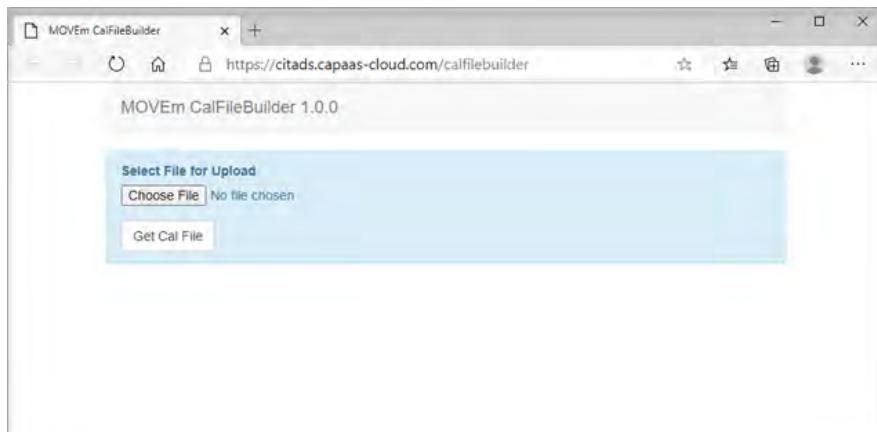
[5] Remove the calibration document from the reject stacker.

[6] Select .

- [7] Export the raw data for calibration.
 → *Section 7.16 “Exporting Raw Data”, p. 254*
 ⇒ The raw data are copied to the USB drive as a *.nif* file.

Generating the MTS Calibration File in the PC

- [8] Connect the USB stick to the PC.
 [9] Browse to the cloud location <https://citads.capaas-cloud.com/calfilebuilder>.



- [10] Select **Choose File** and navigate to the *.nif* file from the USB drive.
 [11] Select **Get Cal File**.
 ⇒ The calibration file (*.cal*) file is generated.
 [12] Create a folder that is named MTSCalibration in the USB drive and place the *.cal* file in that folder.

Uploading the Calibration File in the BPS C5

- [13] Connect the same USB stick to the BPS C5.

- [14] In the service menu, select .

- [15] Select the relevant calibration file.

- [16] Select .

Result

- ⇒ The MTS is calibrated. The following message is displayed:
MTS File upload successful

7.10 Testing the Sensor (Functional Test)

You can test the status and functionality of the sensors using the **Sensor Function Test** menu.

The sensor functional test is performed in any of the following scenarios:

- High sensor rejection rate
- Sensor replacement
- Sensor calibration failed error
- Sensor calibration
- Any other sensor related issues

The *.nif* file, that is created during sensor function test, is used for the sensor analysis.

This procedure shows how to perform sensor function test.

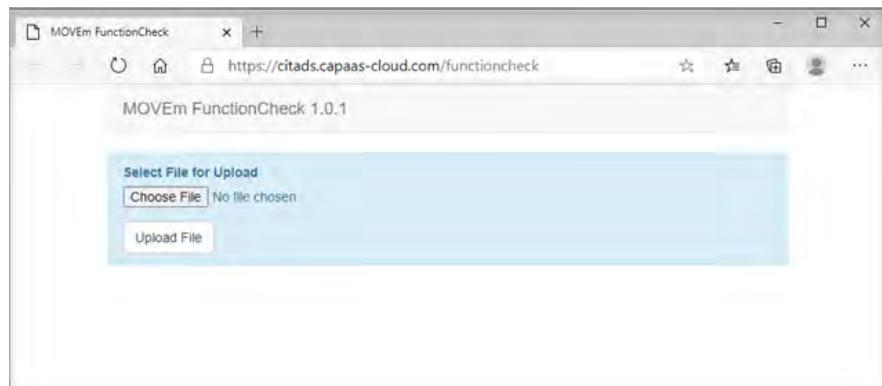
Requirements

- Service login
→ *Section 7.2 “Logging in as Service”, p. 200*
- Function test document (Art.-No.: 514869001)
- USB stick connected of the BPS C5
- PC with administrative right

Procedure

- [1] Select .
- [2] Select the **992** OP mode.
- [3] Insert the function test document precisely into the singler making sure that there is no skew.
The function test document is processed and stacked the delivery stacker1.
If the function test document is rejected, then repeat → [2] with a new function test document.
- [4] Select .
- [5] Remove the document from the stacker to close the deposit.
- [6] Select 
⇒ The sensor function test data is sent to the USB as *.nif* file.

- [7] Remove the USB from the BPS C5.
- [8] Connect the USB to the PC.
- [9] Browse to the cloud location <https://citads.capaas-cloud.com/functioncheck>.



- [10] Select **Choose File** and navigate to the *.nif* file from the USB drive.
 - [11] Select **Upload File**.
- ⇒ If the sensor function test is successful, a message is displayed. If the test is unsuccessful, the failure causes are listed.

7

Result

7.11 Switching On/Off the Authenticity Features

You can switch on/off any of the following security/ authenticity features for any particular denomination/ emission or a complete adaptation using the tab. The switch option is available only if it is configured via BPS Eco-Configurator

- MAG
- IR
- UV
- Composed
- Composed SNR
- OCR Ignore Failure
- OCR Fail to Unfit
- Security Feature

By enabling a switch, you are disabling that particular authenticity/ security feature. During banknote processing operations, banknotes will not be rejected for this particular feature.

This procedure shows how to switch on/off the authenticity features.

Requirements

- Service login

→ *Section 7.2 "Logging in as Service", p. 200*

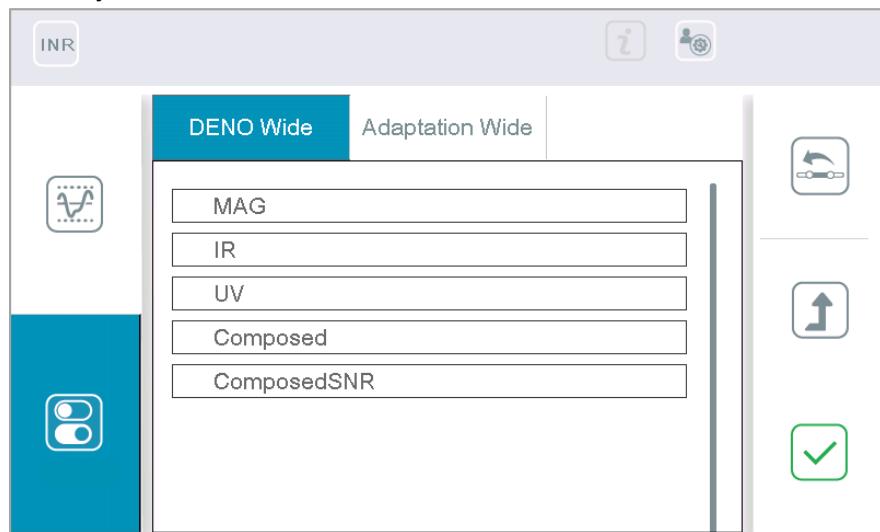
Procedure

[1] Select .

[2] Select .

[3] Select the desired currency.

Switching On/Off Authenticity/Security Features for Denomination/Emission



[4a] In the tab, select the authenticity/security feature you want to enable/disable.

[4b] Select .



<input checked="" type="checkbox"/> 2000e	<input type="checkbox"/> 200e	<input type="checkbox"/> 5b	<input type="checkbox"/> 10b	
<input type="checkbox"/> 20b	<input type="checkbox"/> 50b	<input type="checkbox"/> 100b	<input type="checkbox"/> 500b	
<input type="checkbox"/> 1000b	<input type="checkbox"/> 10c	<input type="checkbox"/> 20c	<input type="checkbox"/> 50c	
<input type="checkbox"/> 100c	<input type="checkbox"/> 500c	<input type="checkbox"/> 1000c	<input type="checkbox"/> 20d	

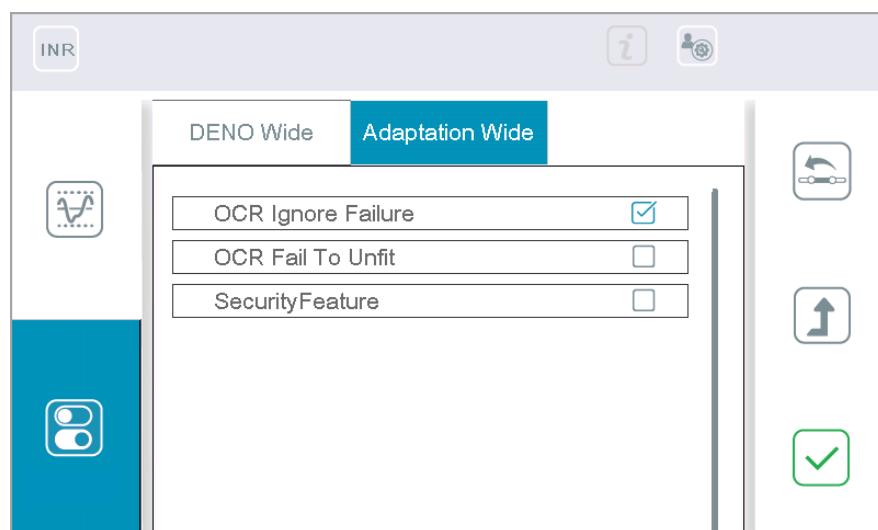
- [4c] Select the desired denomination/emission.
The numeric value stands for denomination and the character stands for emission.

[4d] Select .

⇒ The authenticity/security feature for that particular denomination/emission is disabled.

Switching On/Off the Authenticity/Security Feature for an Adaptation

- [5a] Select the tab.



DENO Wide **Adaptation Wide**

<input checked="" type="checkbox"/> OCR Ignore Failure
<input type="checkbox"/> OCR Fail To Unfit
<input type="checkbox"/> SecurityFeature

- [5b] Check the desired authenticity/security feature.
[5c] Select .

Result

- ⇒ The authenticity/security feature is disabled for the entire adaptation.
The authenticity/security feature is switched on/off.

To reset to default, select .

7.12 Changing the Fitness Threshold

Sorting thresholds are limit values for the fitness sorting of banknotes.

The set values apply to all operating modes. Depending on the adaptation, you may change the sorting threshold for every denomination that is based on emission and every property/quality of the banknotes.

The following procedure shows how to change the fitness threshold setting.

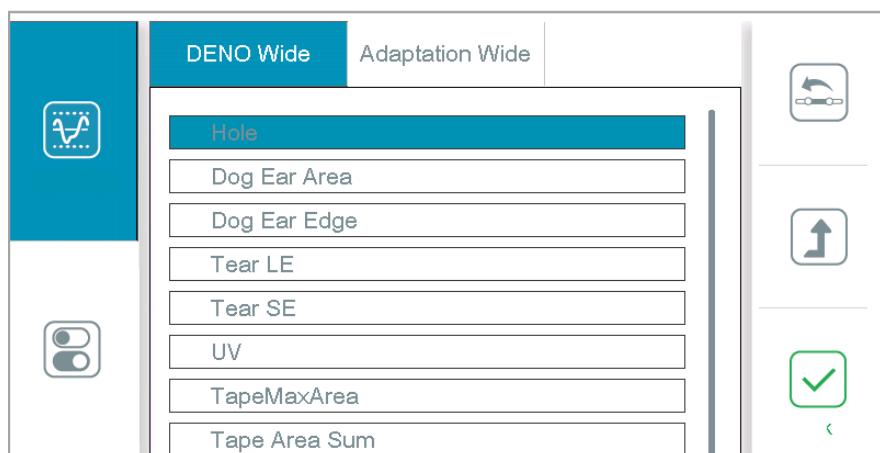
Requirements

- Service login
→ *Section 7.2 "Logging in as Service", p. 200*
- The desired currency is selected.

Procedure

[1]

Select .



[2]

In the **Deno Wide** tab, select the mechanical sorting threshold that you wish to change.

To reset the threshold across all denomination/emission for all the mechanical threshold value, select .

[3]

Select



2000e	5b	10b	20b
50b	100b	500b	1000b
10c	20c	50c	100c
500c	1000c	100d	500d

▲

[4]

Select the desired denomination/emission.

The numeric value stands for the denomination and the character stands for emission.

To reset the selected mechanical threshold value for all denomination/emission, select

7

[5]

Select



OCRMaxUnrecognized

0 100

ATM/FIT FIT/UNFI

[6]

Change the threshold value using / .

You can also move the button to the desired value.

To reset the selected threshold value for the selected denomination/emission, select .

[7] Select .

[8] Select .

Result

⇒ The fitness threshold is set.

7.13 Improved Recording Tool (IRT)

You can record the raw data of the banknotes by connecting the BPS C5 with the IRT (Improved Recording Tool) and the together.

Raw data are recorded to:

- Create new adaptation
- Stabilize an adaptation

7

Following data can be recorded by the IRT to create and stabilize the adaptation:

- New currencies
- Suspicious and counterfeit banknotes
- New emission
- Fitness test decks like tapped, hole, tear , and so on

Process Overview

Record the raw data of the banknotes by following the steps:

1. Establish the connection between the BPS C5 system and a PC
2. Establish the connection between BPS C5 system and the IRT
3. Prepare the banknotes for recording the raw data
4. Capture Raw Data:
 - For new adaptation
 - For stabilizing adaptation

Connection Overview

To establish the connection, you must follow these steps:

1. Connect the BPS C5 and the PC using a LAN cable.
2. Set the IP address of BPS C5 and the PC in the same range.

This means that if you have set the IP address of the BPS C5 to 192.168. 2.2, the you must set the IP address of you PC to 192.168.2.x.

3. Enter the IP address of the PC in the field in the BPS C5.
4. Enter the IP address of the BPS C5 in the IP Address field of the IRT and connect.

The following figure illustrates how to establish the connection between the BPS C5 and the PC.

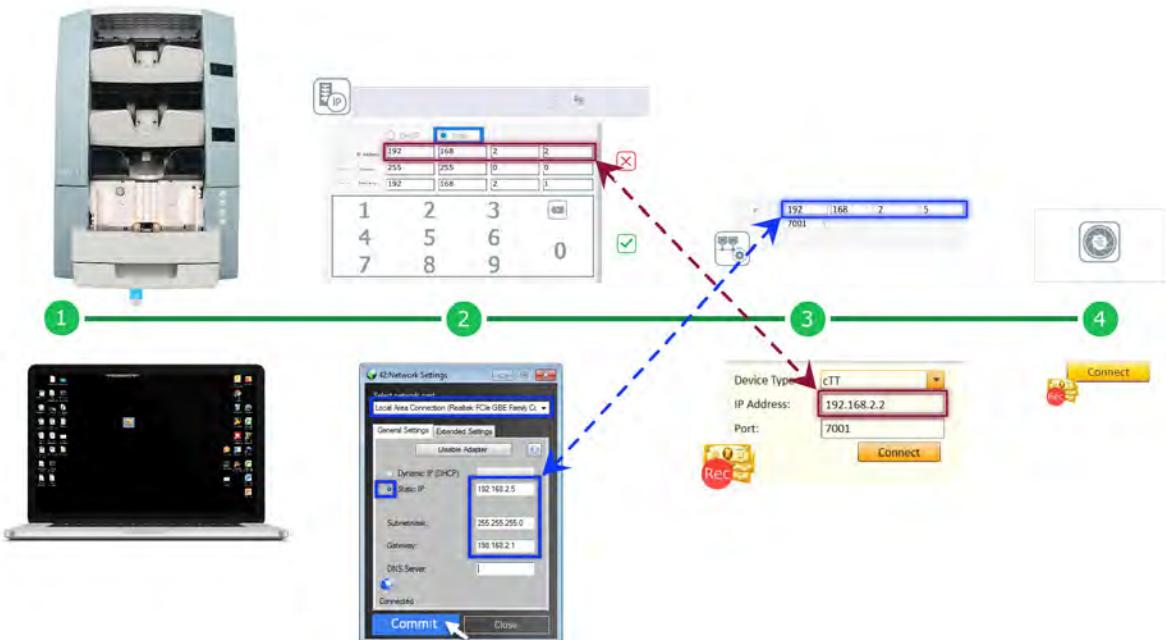


Figure 110: Connecting the BPS C5 to the PC

The following procedure shows how to record the raw data using IRT.

7.13.1 Connecting the BPS C5 and the PC

Requirements

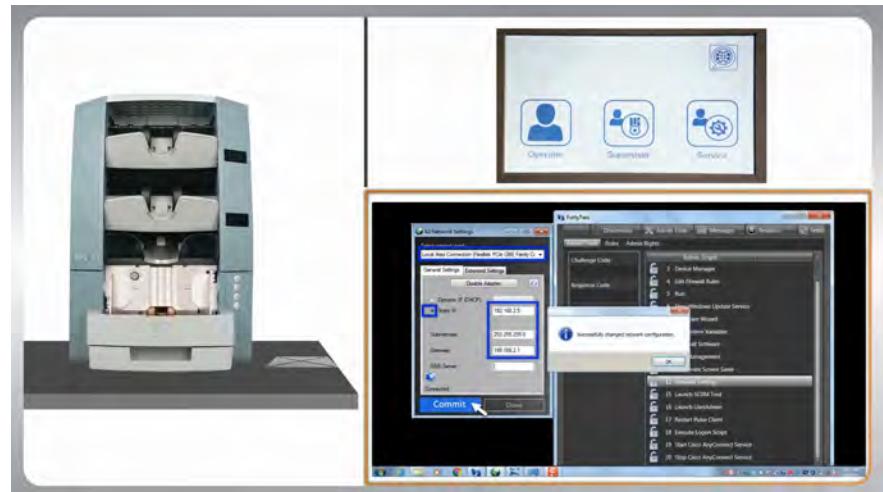
- Service login
→ *Section 7.2 “Logging in as Service”, p. 200*
- PC with administrative rights
- IRT Tool installed on the PC
→ *Section 4.2 “Software Tools”, p. 59*
- LAN cable

Procedure

- [1] Connect the BPS C5 to the PC using the LAN cable.
- [2] Set the IP address of the PC to the range 192.168.x.y, e.g., 192.168.2.5.

The PC and the BPS C5 should be in the same network. You are required to set the IP address of the PC and the in the range 192.168.x.z, e.g., 192.168.2.2.

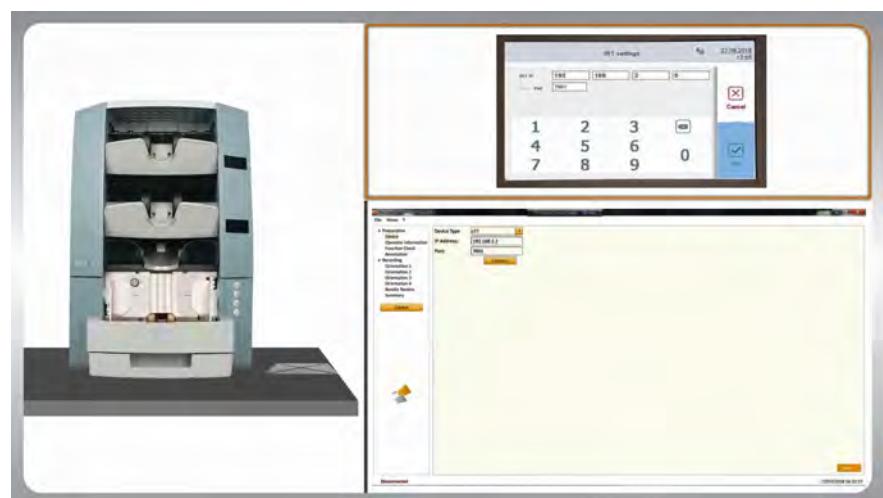
For the procedure to set the BPS C5 IP address, refer to the → *BPS C2 User Manual*.



- [3] In the service menu, select .

[4] Start the **Raw Data Recording Tool** in your PC.

[5] Set the **IP** to the same IP address range (e.g., 192.168.2.5) of the PC.



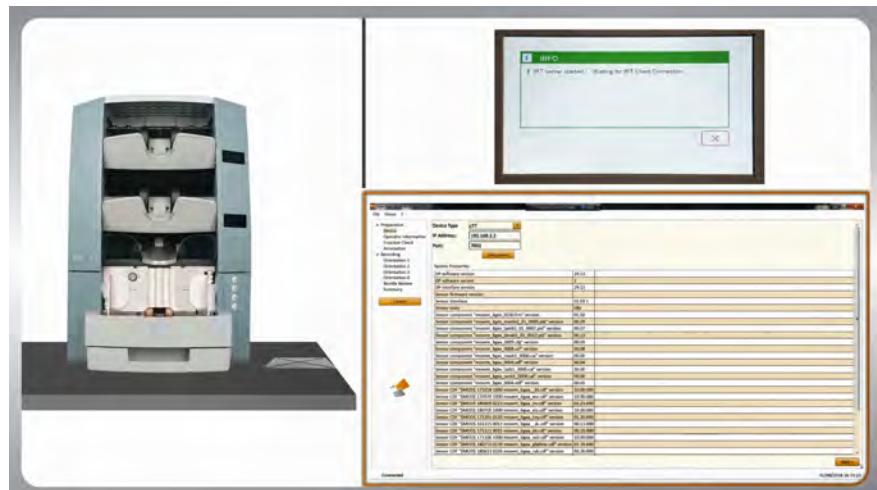
- [6] Select .

[7]

Select  in the BPS C5.

The following message is displayed:

IRT server started. Waiting for IRT Client Connection...



[8]

Select **Connect**.

⇒ The software version information is displayed in the IRT when connection is established between the BPS C5 and the IRT in the PC.

7.13.2 Preparing for Data Recording

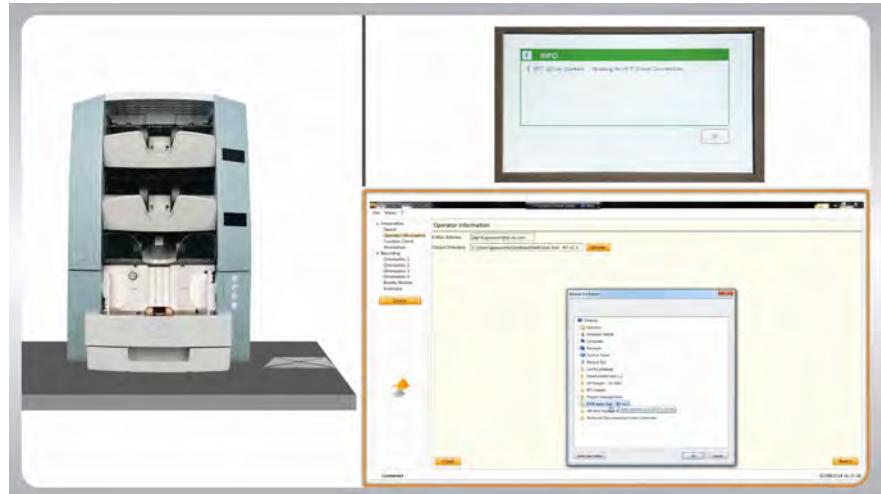
Requirements

- The PC and the BPS C5 connected
→ *Section 7.13.1 “Connecting the BPS C5 and the PC”, p. 222*
- Function test document (Calibration Sheet- set of 25 sheets, Art.-No.:514869001)
- Required number of banknotes

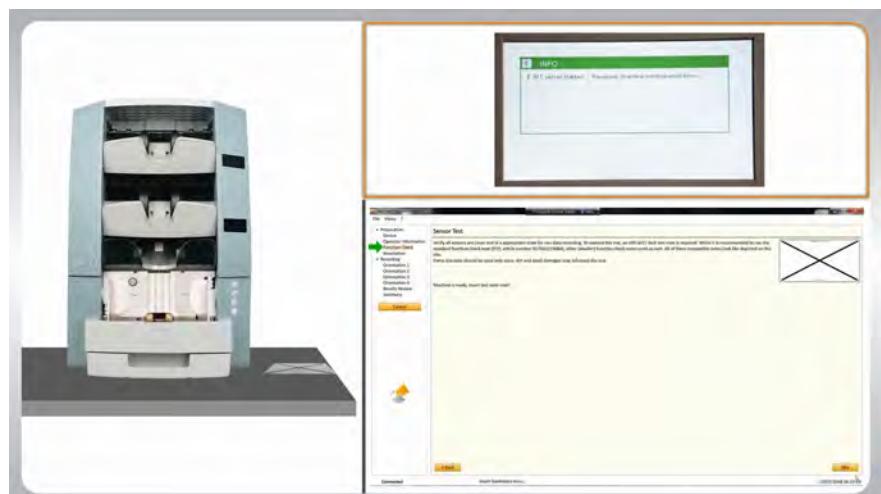
Preparing for Data Recording

[1]

Select **Next**.



- [2] Enter your e-mail address (optional).
- [3] Select the **Output Directory** here you wish to save the raw data.
- [4] Select **Next**.



- [5] Select **Set machine ready**.
- [6] In the BPS C2, insert the function test document into the singler making sure that there is no skew.
 - ⇒ The function test document is processed and sorted to delivery stacker 1.
- [7] Select .
- [8] Remove the document from the stacker and close the deposit.

⇒ The BPS C5 system checks the sensor functionality. If the sensors functioning it will give message of successful. If it gives any error clean the respective sensor and try again with new function test document till the successful message appears is now ready to capture raw data.

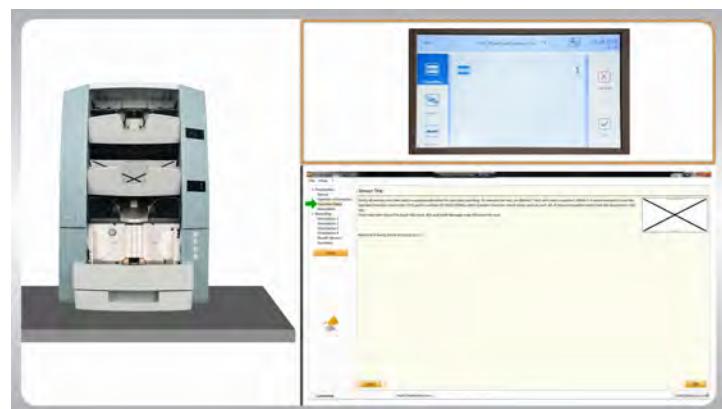
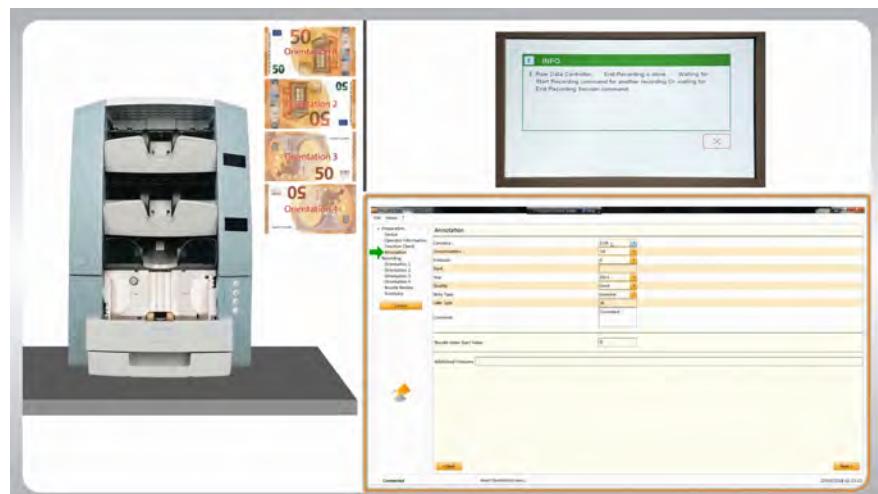
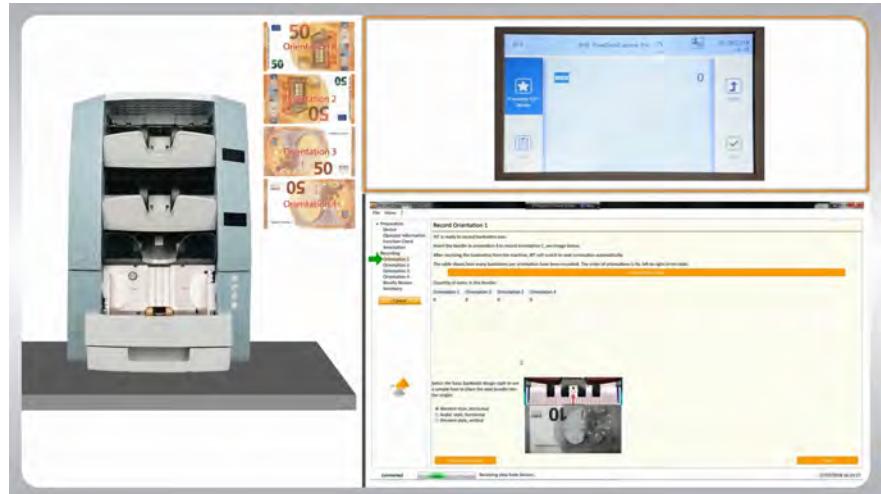


Figure 111: Function Check Successful

7



- [9] Enter the **Annotation** values as per the guideline from the adaptation team.
The file name of the captured data will be according to the field values.



[10] Select 

[11] Remove the banknotes from the singler and the delivery stackers.

⇒ The data transfer starts.

The following message is displayed, once the data is transferred to the desired location on the PC:

**Raw Data Controller... End Recording is done...
Waiting for Start Recording command for another
recording Or waiting for End Recording Session
command...**

In the IRT, orientation 2 is automatically enabled.

7

7.13.3 Raw Data Capture Options

In the BPS C5, the screen appears.

For an existing adaptation, there is only one operation mode (**999**).

For a new adaptation, there are three operation modes based on the 100 dpi color channel source (RED/BLUE/GREEN).

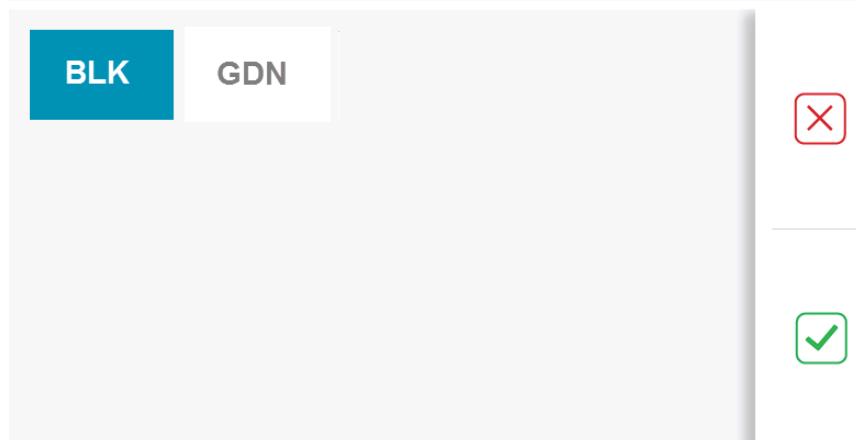
- **RawDataCapture_Blue** (995)
- **RawDataCapture_Green** (994)
- **RawDataCapture_Red** (993)

7.13.4 Capturing Raw Data

Requirements

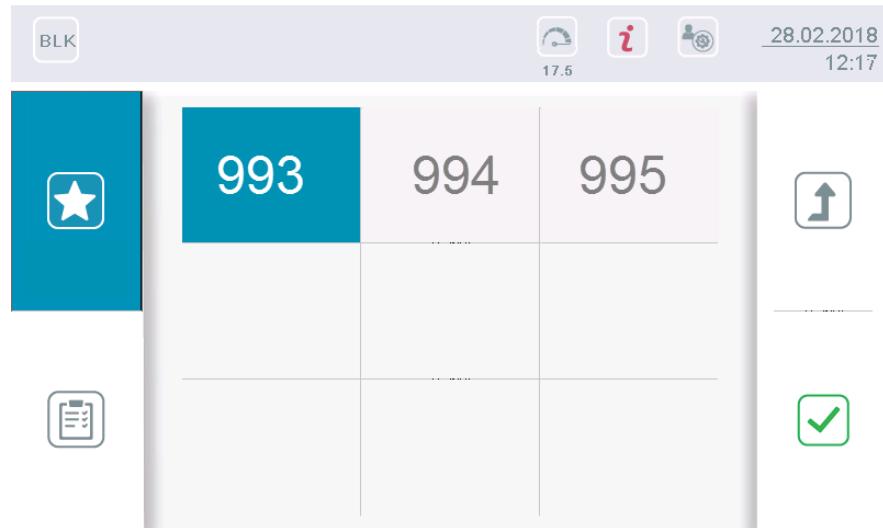
- Service login
 - *Section 7.2 “Logging in as Service”, p. 200*
- PC with administrative rights
- IRT Tool installed on the PC
- LAN cable
- Function test document (Calibration Sheet- set of 25 sheets, Art.-No.:514869001)
- Required number of banknotes
- Prepared for Data Recording
 - *Section 7.13.2 “Preparing for Data Recording”, p. 224*

Capturing Raw Data for New Adaptation



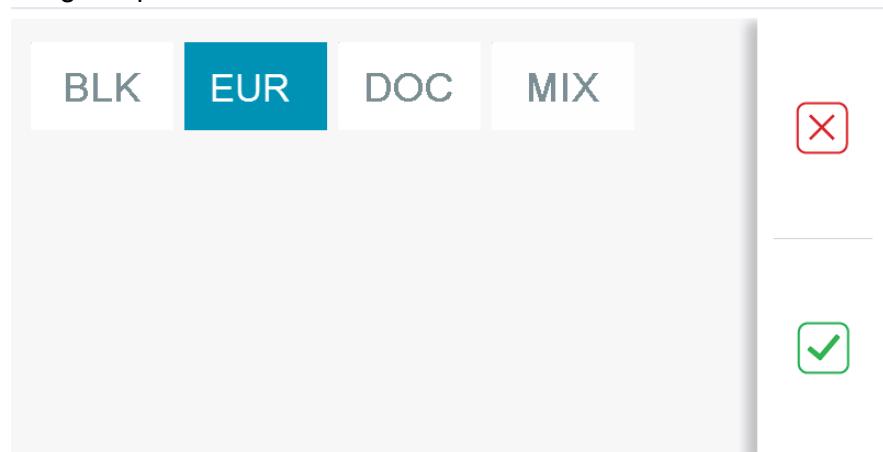
[1a] In the BPS C5, select the blank currency.

[1b] Select .



- [1c]** Select the operation mode based on the color source as per the guidelines from the adaption team.
- [1d]** Go to → [3].

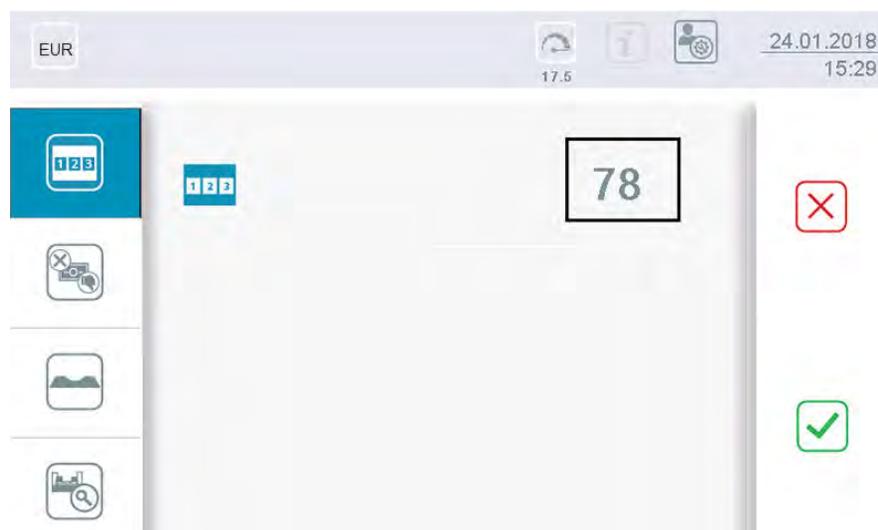
Capturing Raw Data for an Existing Adaptation



- [2a]** Select the desired currency.
- [2b]** Select .
- [3]** Insert the banknotes (maximum of 100 at one time) into the singler for orientation1.
⇒ The banknotes are sorted to delivery stacker 1.
Once the transaction is complete, data will be automatically transferred to the designated folder.



Figure 112: Banknote Orientation



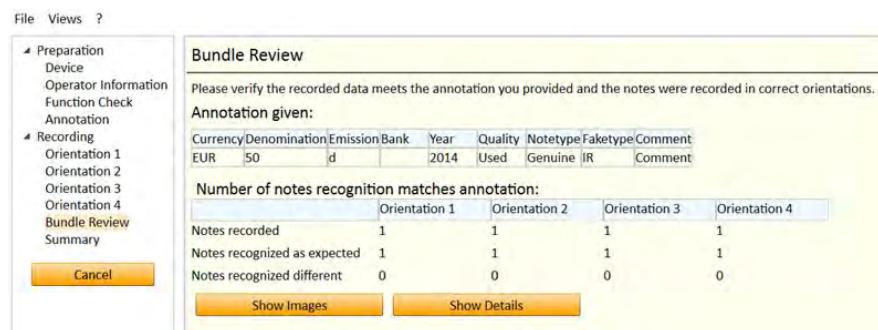
- [4]** Select .
- [5]** Remove the banknotes from the singler and the delivery stackers.
 ⇒ The data transfer starts.
 The following message is displayed, once the data is transferred to the desired location on the PC:
**Raw Data Controller... End Recording is done...
 Waiting for Start Recording command for another recording Or waiting for End Recording Session command...**
 In the IRT, orientation 2 is automatically enabled.
- [6]** Repeat step 1 through step 5 for all the orientations.
 → *Section 7.13.4 “Capturing Raw Data”, p. 228*

⇒ After completing all the four orientations, the **Bundle Review** screen appears. You can select the options of further operations are required.

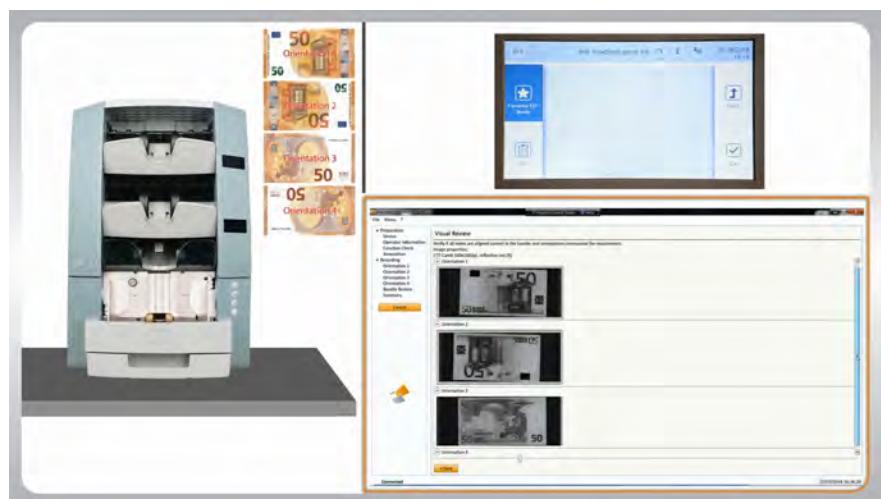
7.13.5 Performing Bundle Review

Requirements

- Service login
→ *Section 7.2 “Logging in as Service”, p. 200*
- PC with administrative rights
- IRT Tool installed on the PC
→ *Section 4.2 “Software Tools”, p. 59*
- LAN cable
- Function test document (Calibration Sheet- set of 25 sheets, Art.-No.:514869001)
- Required number of banknotes



- [1] Select **Bundle Review** to view the details and images of the processed banknotes in each orientation.



- [2] Select the **Save and Finish Task** button in the IRT.

You can select the other relevant options as desired.

- Result ⇒ The raw data is recorded and saved in the designated folder as *.nif* file.
For the other denominations, follow the same procedures.

Name	Date modified	Type	Size
funcheck	8/1/2018 4:24 PM	File folder	
EUR_50_d2014_1_ub00_t00.nif	7/27/2018 4:36 PM	NIF File	1,030 KB
EUR_50_d2014_2_ub00_t00.nif	7/27/2018 4:36 PM	NIF File	1,094 KB
EUR_50_d2014_3_ub00_t00.nif	7/27/2018 4:36 PM	NIF File	1,009 KB
EUR_50_d2014_4_ub00_t00.nif	7/27/2018 4:36 PM	NIF File	1,008 KB

Figure 113: Raw Data Files

Data that are saved in the *Temp* folder is automatically transferred to the base folder. Delete the *Temp* folder manually.

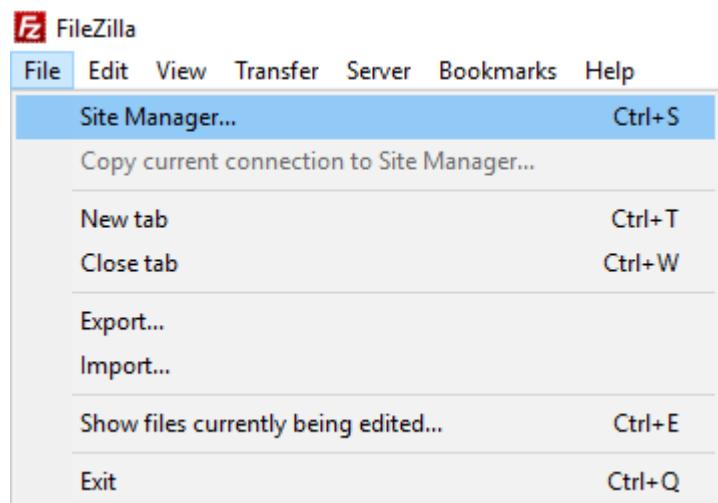
Copy the data in the base folder and send the same to the relevant adaptation teams.

7.13.6 Uploading the *.nif* File in the CAPAAS Cloud

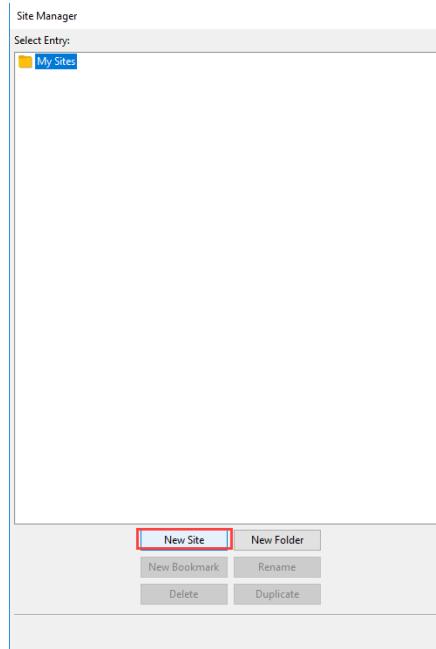
Requirements

- PC with open/ G+D office network Internet connection
- File transfer software installed in the PC, for example, FileZilla Client

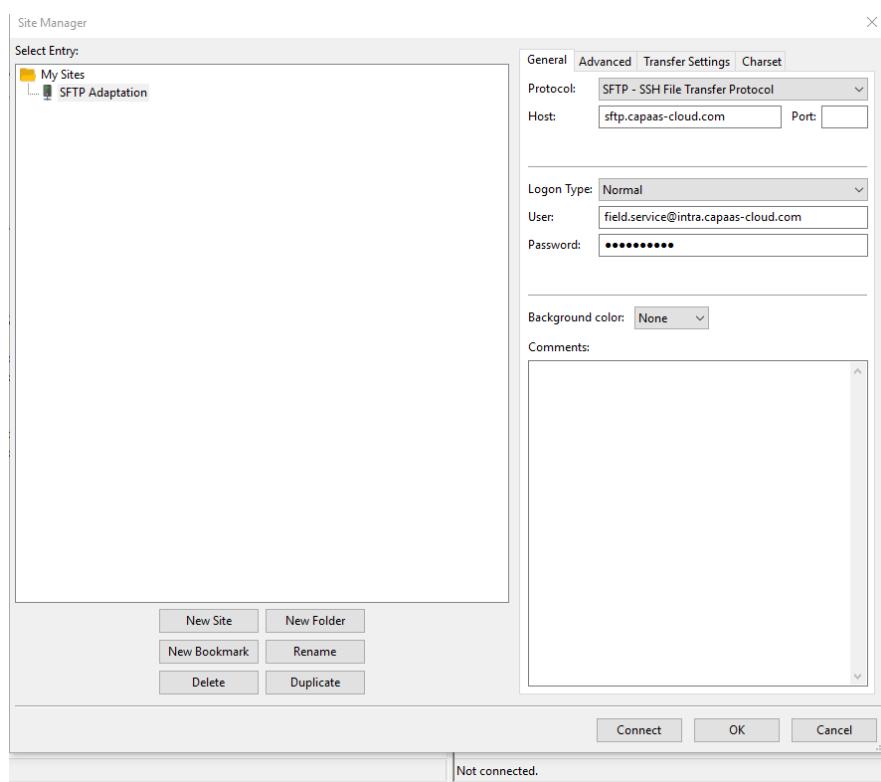
- [1] Open the FileZilla Client.



- [2] Select **File > Site Manager**.



[3] Create a new site.



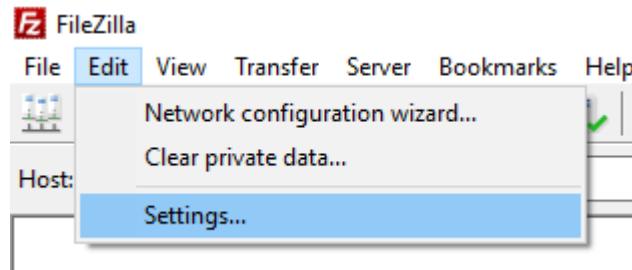
[4] Set the new site parameters.

Enter the following values:

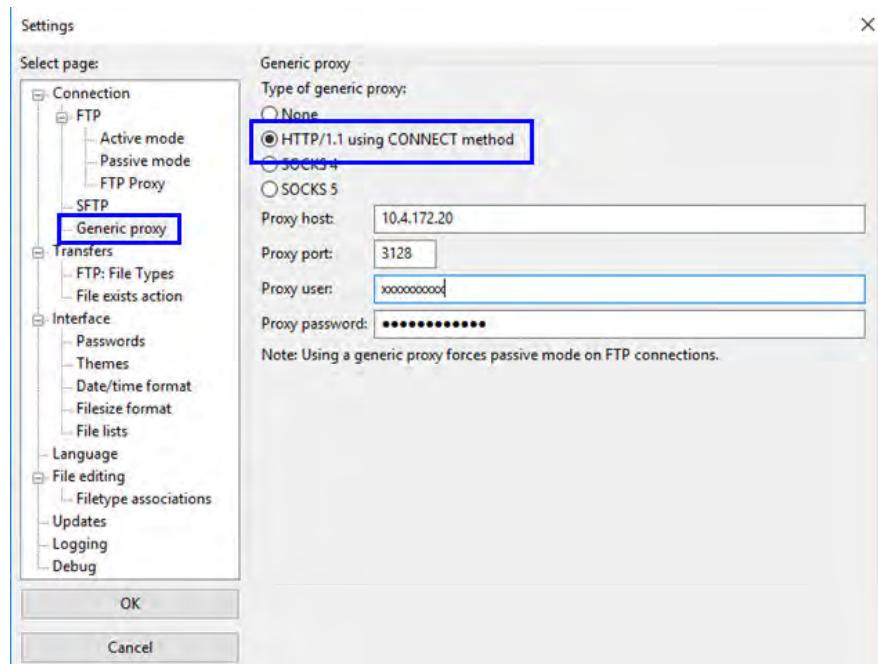
- **Host** : sftp://sftp.capaas-cloud.com
- **Protocol** : SFTP – SSH file transfer Protocol
- **Location Type** : Ask for password
- **User** : field.service@intra.capaas-cloud.com
- **Password** : Cloud.2019

[5] Select Connect.

Step 5-9: For G+D Office Network Users Only



[6] Select **Edit > Settings**.



[7] Set the **Generic proxy** parameters:

Enter the following values:

- **Proxy host**: 10.4.172.20
- **Proxy port**: 3128

- **Proxy user:** Windows User ID
- **Proxy password:** Windows Password

[8] Select OK.

[9] Select

⇒ The SFTP is connected successfully. The **INCOMING/OUTGOING** directories appear on the **Remote site**.

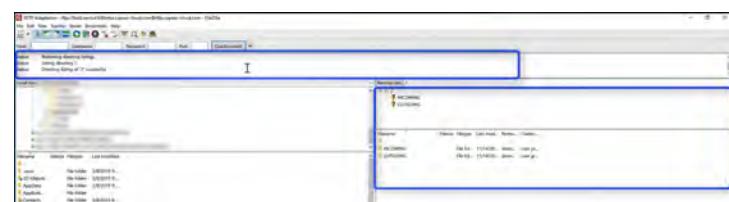
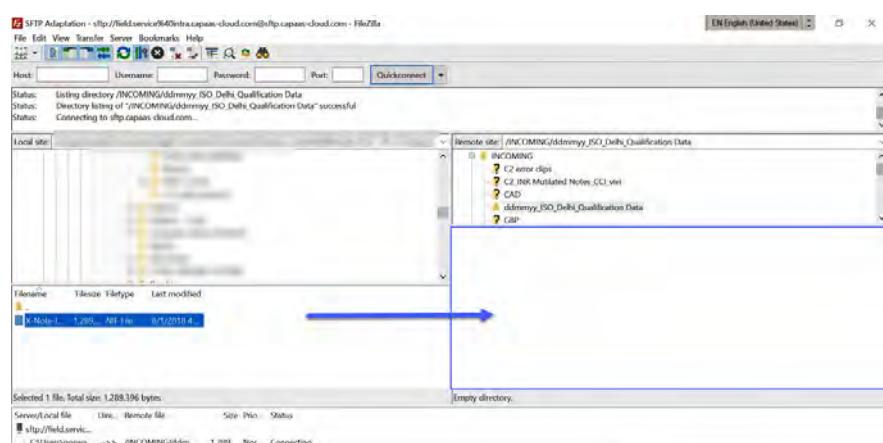


Figure 114: SFTP Connected

[10] Create a folder under the **INCOMING** directory.



[11] Drag and drop the **.nif** files in the folder.

Result

⇒ The **.nif** files are transferred successfully to the CAPAAS Cloud.

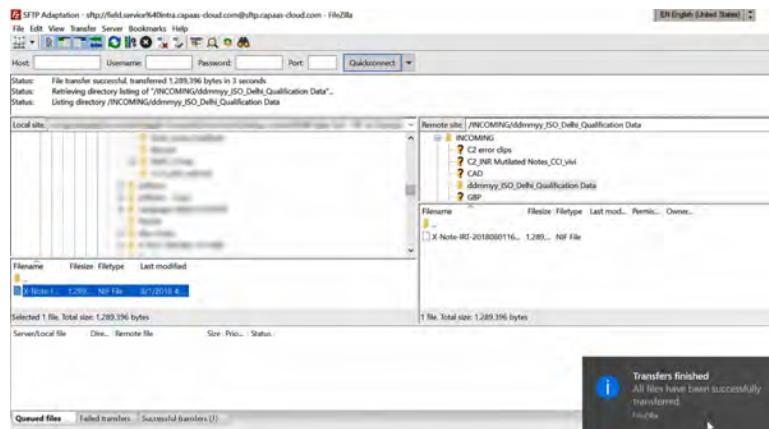


Figure 115: Files Transferred

7.14 Updating the Software Manually

The **Software** menu is available in the screen 2 of the service menu.



Figure 116: Software Update Menu

The **Software** menu provides the following options:

- Software Installation ()
- Configuration package ()
- Languages package ()

- Complete Software Installation: The  switch is used to specify whether there would be a full software update or only delta components are updated during software installation. The delta component includes only the components with newer version. The components, which have same software versions will not be installed if the  is not selected.
Check the  checkbox if you wish to install all the components.

7.14.1 Directory Structure for Software Update

A software update consists of the following directories and files.

Software Installation

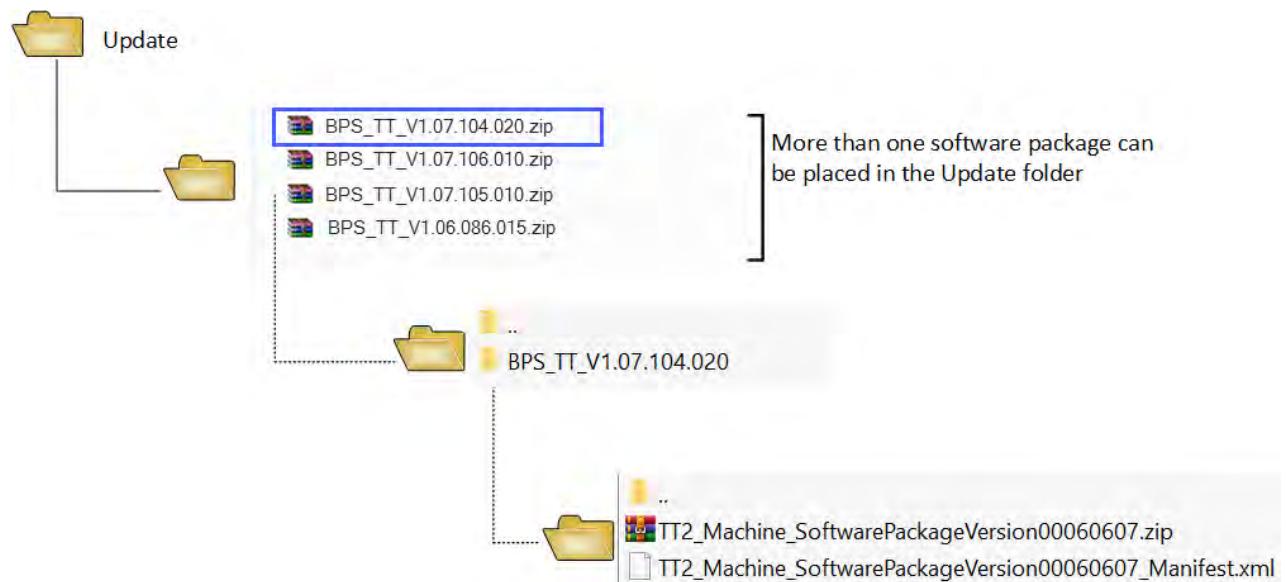


Figure 117: Software Installation Folder Structure

Configuration Package

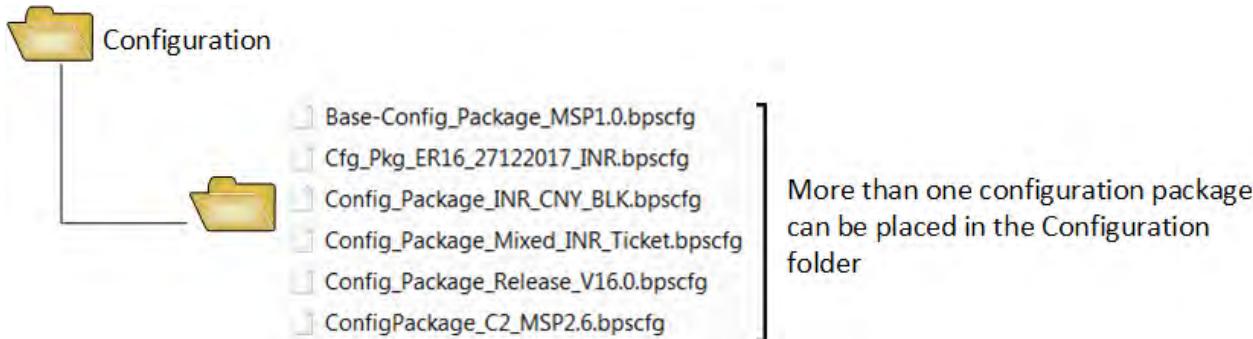


Figure 118: Configuration Package Folder Structure

Language Package

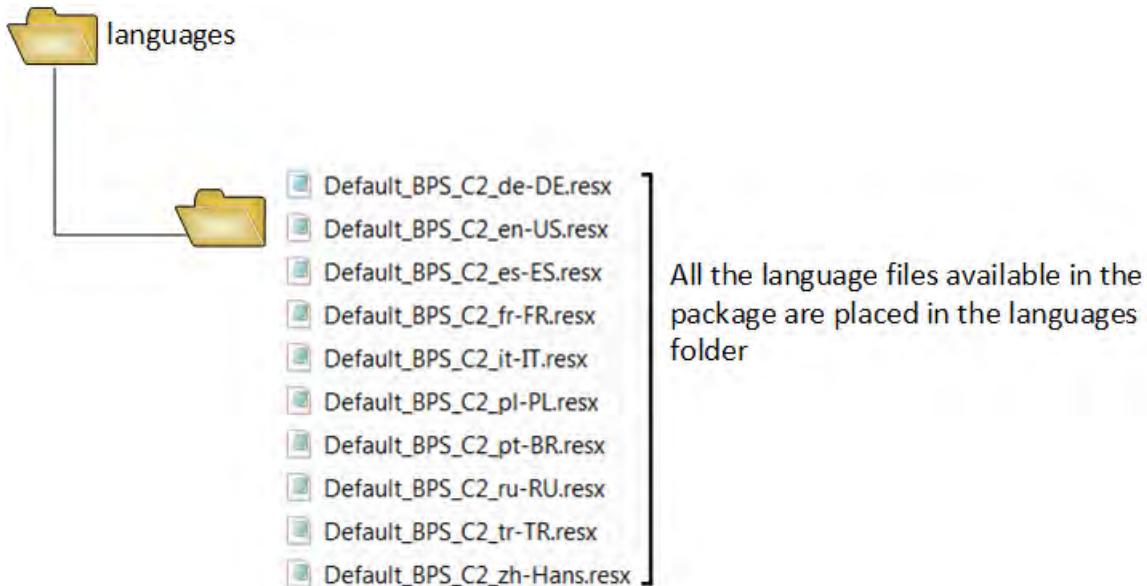


Figure 119: Language Package Folder Structure

7.14.2 Updating the Software Package

This procedure shows how to update the software package.

Requirements

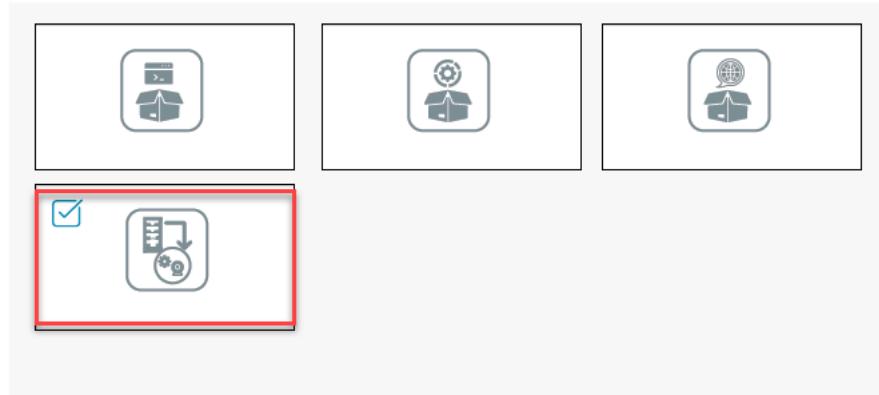
- USB stick, with the software package, placed in the *Update* folder, plugged to the BPS C5
- Service login
→ *Section 7.2 “Logging in as Service”, p. 200*

Procedure

- [1] For complete software installation, check the  switch.

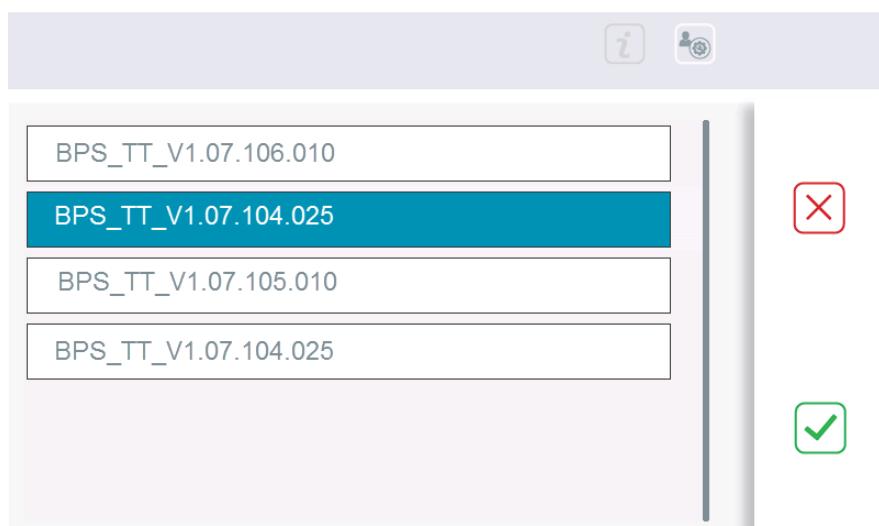
For installing the delta components only, leave the  check box unchecked.

→ *Section 7.14 “Updating the Software Manually”, p. 236*



[2] Select 

[3] Select 



[4] Select the desired software package.

⇒ The software comparison screen appears to display the comparison between the existing software and the selected software.

Software Package	Old Version	New Version
MSP Version	1.0.0	2.1.0
DP App	00.25.06	00.27.00
BSP	9.18	00.09.19
Database	00.01.01	00.01.01
SEN SW	01.30	01.30
MC SW	0.13.18.4	0.13.18.4

- [5] Check for the correctness of the software components and select 
- ⇒ The software installation status is displayed.

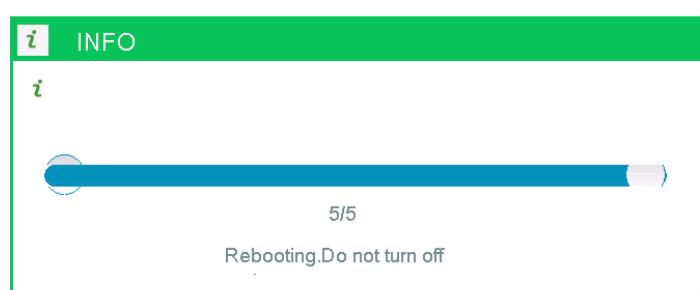


Figure 120: Software Installation Status

The BPS C5 will automatically reboot after the installation is complete.

The following message is displayed:

Software update successful

- [6] Select .
- Result ⇒ The software is updated.
You must adjust the fitness threshold after software installation/update.
→ *Section 7.12 “Changing the Fitness Threshold”, p. 219*

7.14.3 Installing Fresh CAB Software Update

Requirements

- BPS C5 switched off
→ *Section 5.1.1 “Switching BPS C5 On and Off”, p. 63*
- Keyboard connected to BPS C5
- USB stick with latest fresh CAB installation file and the latest software package
- Laptop or PC



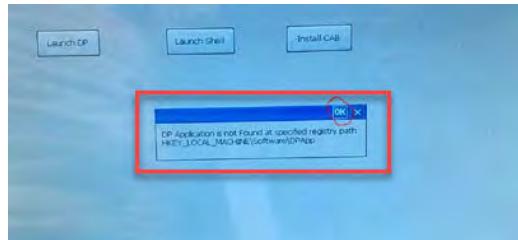
Important!

It is recommended to perform fresh CAB installation only in troubleshooting scenarios and DP processor replacement.

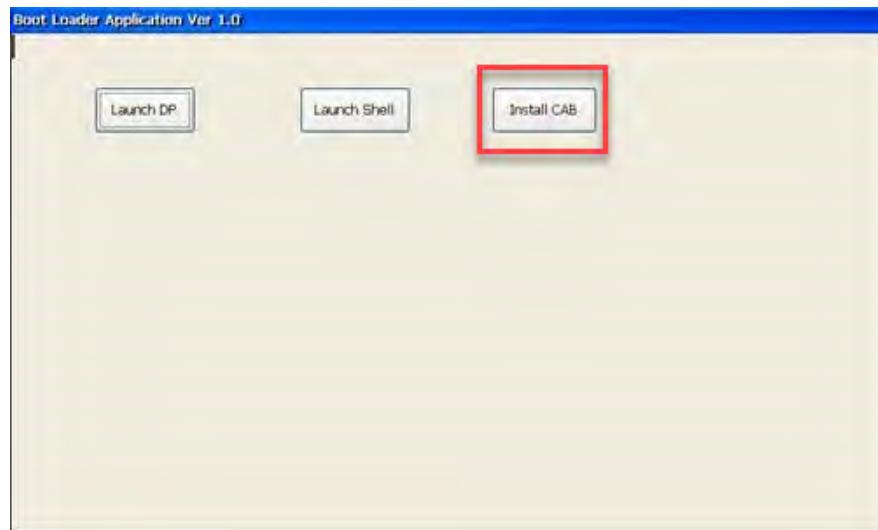
Fresh CAB may lead to data loss. Do not perform fresh CAB installation unless absolutely necessary.

Procedure

- [1] Switch on the BPS C5.
→ *Section 5.1.1 “Switching BPS C5 On and Off”, p. 63*
- [2] Interrupt the boot-up procedure by pressing the **Enter** after the start.



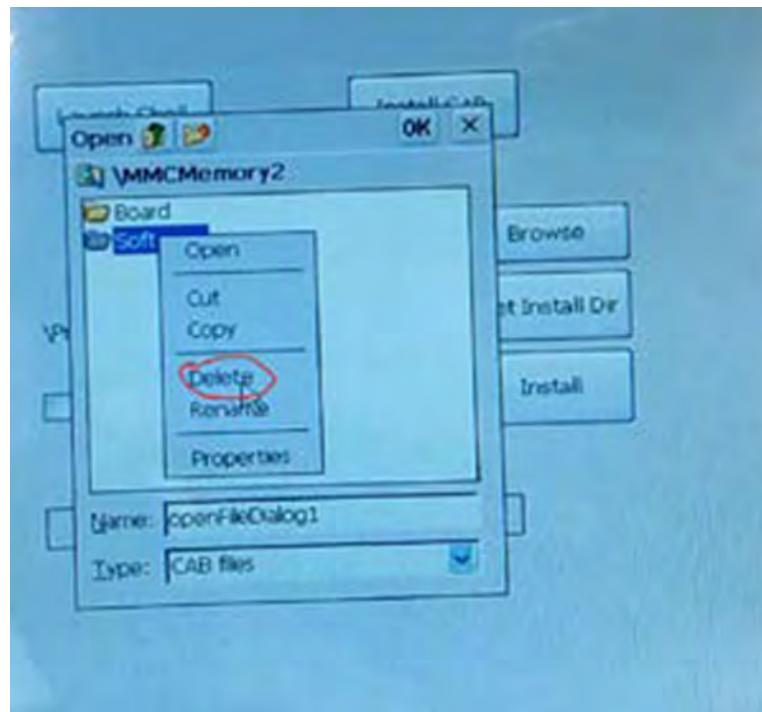
- [3] Select **OK** to close the bootloader console



[4] Select **Install CAB**.

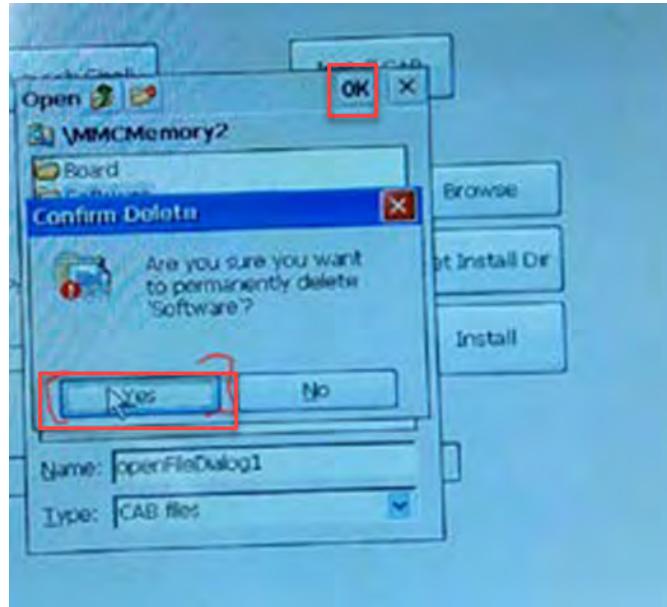
Deleting Existing Software

[5] Select **Browse**.



[6] Select **MMCMemory2** directory and select **OK**.

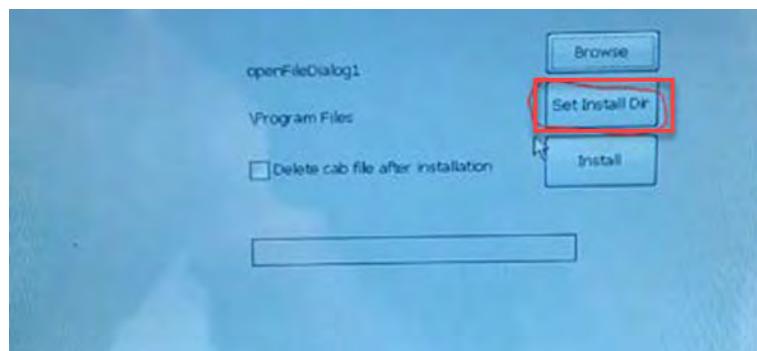
[7] Right click on the **Software** and folder and select **Delete**.



- [8] Select **Yes** to confirm.
- [9] Select **X** to close the **Browse** window.

Installing Fresh CAB Software

- [10] Connect the USB stick with the latest fresh CAB software to the BPS C5.1
- [11] Select **Install CAB**.



- [12] Select **Set Install Dir**.
- [13] Select the **VMMCmemory2** directory.
- [14] Create the folder **Software**.
To create, type software in the name box and select **OK**.
- [15] Browse to **Hardisk** directory.
The fresh CAB software is copied in the **Hardisk** folder.
- [16] Select the CAB file and select **OK**.

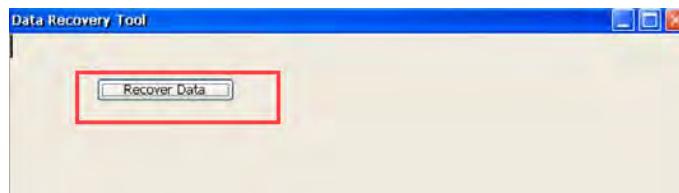
[17] Select **Install**.

Restoring Backup from the SD Card



[18] Select the **Command** menu on the boot loader console.

[19] Select **Data Recovery Tool**.



[20] Select **Recover Data**.

[21] Restart the BPS C5.

Result

⇒ You have successfully restored the backup data from the SD Card.



Important!

Restoring backup option restores the global counters, language files and configuration package from SD Card.

7.14.4 Updating Software After PCB Main Board Replacement

Requirements

- Main board replaced

→ *Section 5.13.1 “Removing the PCB Main”, p. 139*

BPS C5 switched on

→ *Section 5.1.1 “Switching BPS C5 On and Off”, p. 63*

Procedure

After the PCB board is replaced, the BPS C5 boots up.

[1] Log in as **Service**.

→ *Section 7.5 “Viewing the Software Version Details”, p. 205*

- [2] Select .

- [3] Note down the **System Release Version**.

→ *Section 7.5 “Viewing the Software Version Details”, p. 205*

- [4] Install the same software version noted in the step 3.

→ *Section 7.14.2 “Updating the Software Package”, p. 238*

Result ⇒ The main PCB board replacement is completed.

7.14.5 Updating Software After Sensor Processor Replacement

Requirements

- Sensor processor replaced
- → *Section 5.13.2 “Replacing the Processors”, p. 141*
- BPS C5 switched on
→ *Section 5.1.1 “Switching BPS C5 On and Off”, p. 63*
- USB stick connected to the BPS C5
- Respective one click software available



Important!

Note the version of the software, which was installed in the BPS C5 before replacing the sensor processor. Make sure that same version of the software is installed after replacing the sensor processor.

Procedure

After the sensor processor is replaced, the BPS C5 boots up.

- [1] Log in as **Service**.

→ *Section 7.5 “Viewing the Software Version Details”, p. 205*

- [2] Select .

System Release Version	
DP_SAW	58.4
DP_QS	20.18
DP_ib	3.12.0
MC_SAW	22.44.1
Sensor_SAW	16.29
FPGA	0.1.0
Boot_Lööder	0.1.0
Configuration Package	BPS_C5_MIP6.5_INR_TXT_EU
MMS_Agent	N/A
Check_FW_version	1.0.5
_BL_Version	10.00.000
_TK_Version	10.01.000
INR_Version	10.01.000
EUR_Version	10.00.000
English_Version	04.08.01



Back

- [3] Note down the sensor software version.
- [4] Export logs.
→ *Section 7.17 “Copying Log Files to USB Stick”, p. 254*
- [5] Insert the USB stick with the log files to a PC.
- [6] Extract the log files in the PC

419ST25402_SystemTest_GREEN_2019-11-21_17-43-55.log		1,031
419ST25402_SystemTest_RED_2019-11-21_17-43-30_Passive.log		1,028
419ST25402_SensorStatistics_2020-06-18_12-00-35.sta		2,320
SftpLogs.txt		12,693
419ST25402_SensorTrace_2020-06-18_12-00-35.log		5,408
419ST25402_StartupLog_2020-06-18_11-56-11.log		18,733
419ST25402_StartupLog_2020-06-18_11-48-36_Passive.log		20,299
419ST25402_SensorInventory_2020-06-18_12-00-35.txt		37,971
BootLoader.log		244,070
419ST25402_SensorSelfTest_2020-06-18_12-00-35.tst		51,892
419ST25402_SensorError_2020-06-18_12-00-35.log		69,888

[7] Open Sensor Inventory file.

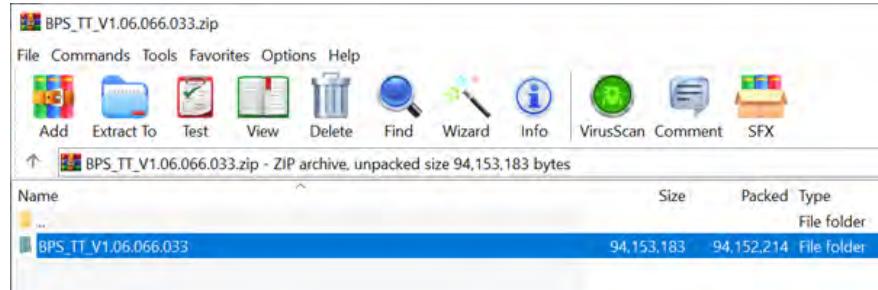
⇒ The sensor inventory file consists of the following information:

```
READER:NAME=BGAA FAMILY_ID=2 DEVICE_ID=9 PRODUCT_ID=21;
BOARD1:NAME=DMAB ITEM=01750250393 SERIAL=5500000175 REV=F HWID=5 SOC=3000 EEP=1 PLDVER=17;
BOARD2:NAME=SOM ITEM=000000616101 SERIAL=0003872233 REV=A HWID=6 CORES=2 FREQ=996 RAM=2048 FLASH=3195;
SENSOR1:NAME=PT11 ITEM=01750288345 SERIAL=87H5000476 SLAVE=87H5000752 REV=D SOC=0000 HWID=1 SLOTID=0 EEP=3;
SENSOR2:NAME=PT12 ITEM=01750288344 SERIAL=87H5000752 REV=D SOC=0000 HWID=2 SLOTID=1 EEP=6;
SENSOR3:NAME=MAX ITEM=01750267877 SERIAL=540B007376 REV=D SOC=0000 HWID=8 SLOTID=5 EEP=7 PLDVER=10;
SENSOR4:NAME=UPURE ITEM=01750266440 SERIAL=0 REV=A SOC=0000 HWID=4 SLOTID=6 EEP=9 PLDVER=1;
SENSOR5:NAME=MTS ITEM=01750268400 SERIAL=540B009353 REV=C SOC=0000 HWID=3 SLOTID=8 EEP=8 PLDVER=7;
VERSION_PKG:VER=$MODS 190301 1015 MOVM_BGXX.PKG;
VERSION_APIMOVE:VER=1.08;
VERSION_APITOOL:VER=01.10;
VERSION_ESH:VER=V0174 commit=109b1de;
VERSION_OS:VER=V0174;
</INV_ENTRY>
```

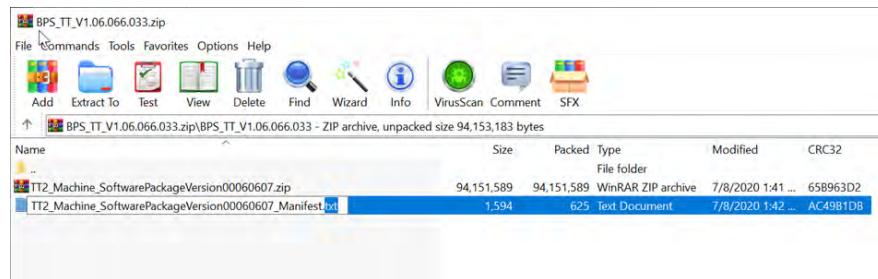
Figure 121: Sensor Inventory File

Note down the following values:

- Sensor SOM revision (for example, in the above image, the SOM version is A.2)
- DMAB revision (for example, in the above image, the DMAB version is F)
- BGAA product and device ID (for example, in the above image, the device ID is 9 and product ID is 21)
- Sensor version (for example, in the sensor inventory, the sensor version appears to be 1015. This means that the sensor version is 10.15)



- [8] In the *Update* folder, double click the software installation package (for example, *BPS_TT_V1.05.056.004_CE*).
The software package folder open as below in the **Winrar** application.



- [9] Change the manifest file extension from *.xml* to *.txt*.
For example, in the above image rename the *TT2_Machine_SoftwarePackageVersion00060607_Manifest.xml* file to *TT2_Machine_SoftwarePackageVersion00060607_Manifest.txt*.
To rename, click on the file name twice.
- [10] Open the *TT2_Machine_SoftwarePackageVersion00060607_Manifest.txt* file.
The file opens in **Notepad** application.

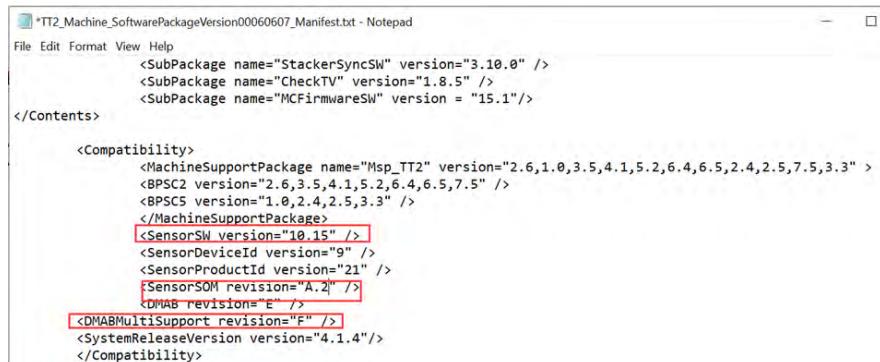
```

<Compatibility>
  <MachineSupportPackage name="Msp_TT2" version="2.6,1.0,3.5,4.1,5.2,6.4,6.5,2.4,2.5,7.5,3.3" />
  <BPSC2 version="2.6,3.5,4.1,5.2,6.4,6.5,7.5" />
  <BPSC5 version="1.0,2.4,2.5,3.3" />
</MachineSupportPackage>
<SensorSW version="10.2" />
<SensorDeviceId version="9" />
<SensorProductId version="21" />
<SensorSOM revision="A.2,A.3,A.4" />
<DMAB revision="E" />
<DMABMultiSupport revision="D,E,F,G,H" />
<SystemReleaseVersion version="4.1" />
</Compatibility>

```

- [11] Edit the manifest file compatibility section as shown in the above image.
Make all highlighted field same as the values in *Sensor Inventory* file.

For the above example, the values of **SensorSW**, **Version**, **SensorSOM**, **Revision** and **DMABMultiSupport revision** are edited as these values are different from the values in the *Sensor Inventory* file.



```
* TT2_Machine.SoftwarePackageVersion00060607_Manifest.txt - Notepad
File Edit Format View Help
<SubPackage name="StackerSyncSW" version="3.10.0" />
<SubPackage name="CheckTV" version="1.8.5" />
<SubPackage name="MCFirmwareSW" version = "15.1"/>
</Contents>
<Compatibility>
<MachineSupportPackage name="Msp_TT2" version="2.6,1.0,3.5,4.1,5.2,6.4,6.5,2.4,2.5,7.5,3.3" >
<BPS2 version="2.6,3.5,4.1,5.2,6.4,6.5,7.5" />
<BPS5 version="1.0,2.4,2.5,3.3" />
</MachineSupportPackage>
<SensorSW version="10.15" />
<SensorDeviceId version="9" />
<SensorProductId version="21" />
<SensorSOM revision="A.2" />
<DMAB revision="E" />
<SystemReleaseVersion version="4.1.4"/>
</Compatibility>
```

[12] Save the manifest file.

[13] Change the manifest file extension from *.txt* to *.xml*.

The file is saved with zip. Use the same file for software installation

[14] Install the updated software package.

→ *Section 7.14.2 “Updating the Software Package”, p. 238*



Important!

This package is only for this machine after sensor SOM replacement. Do not install this package in any other machine. It is recommended to delete this edited package from your PC/USB after installation.

Result

⇒ The sensor processor replacement is completed.

7.14.6 Updating Software After DP Processor Replacement

Requirements

- DP processor replaced
→ *Section 5.13.2 “Replacing the Processors”, p. 141*
BPS C5 switched on
→ *Section 5.1.1 “Switching BPS C5 On and Off”, p. 63*
- USB drive with Fresh CAB file and configuration package inserted in to the BPS C5

**Important!**

Note the version of the software, which was installed in the replaced DP processor. Make sure that same version of the software is installed after replacing the DP Processor.

The software version can be found in the XML reports generated for the replaced DP Processor.

For example, if software version 4.1 was installed in the old DP Processor, then the software version 4.1 must be installed in the fresh cab installation after DP Processor replacement.

Procedure

- [1] Remove the SD card of from the replaced DP processor.
- [2] Install the same SD card in the new DP processor.
- [3] Install the Fresh CAB.
→ *Section 5.25 “Replacing the Stacker Units in Standard Delivery Module (SDM)”, p. 170*
- [4] Restart the BPS C5
- [5] Log in as Service.
→ *Section 7.2 “Logging in as Service”, p. 200*
- [6] Restore the SD card backup.
→ *Section 7.20.2 “Restoring Backup from the SD Card”, p. 260*
- [7] Install the configuration package.
→ *Section 7.14.7 “Updating Configuration Package”, p. 250*
- [8] Install the software.
→ *Section 7.14.2 “Updating the Software Package”, p. 238*

Result

- ⇒ The DP processor replacement is completed.

7.14.7 Updating Configuration Package

You can configure the BPS C5 in different ways as per requirement by installing/updating configuration package. The standard configuration package contains several default configurations.

You can create/customize the configuration package using the BPS Eco Configurator tool. You can customize the following features:

- Adding currency
- Grouping\customizing reject reasons
- Creating OP modes
- Customize/set reports targets/triggers

This procedure shows how to update the configuration package.

Requirements

- Service login
→ *Section 7.2 “Logging in as Service”, p. 200*
- The USB stick with the configuration package, placed in the *Configuration* folder, is plugged to the BPS C5



Important!

When you update the configuration package, the existing data, OP modes, and reports are deleted.

Procedure

7

- [1] Select 
 - [2] Select 
 - [3] Select the desired installation file and version.
 - [4] Select 
- ⇒ You will receive a warning.
Warning Statistical data, OPmodes and reports will be deleted for the deleted adaptation. 1. Press Ok to continue. 2. Press Cancel to stop installation.
- [5] Select 
- The BPS C2-2 automatically reboot after the installation is complete. The following message is displayed:
Config Package Updated Successfully.
- Result ⇒ The installation is complete. The BPS C5 saves a copy of the configuration package, which can be exported to a USB stick.

7.14.8 Updating Language Package

You can update the language package to install new languages or an updated version of the language package software.

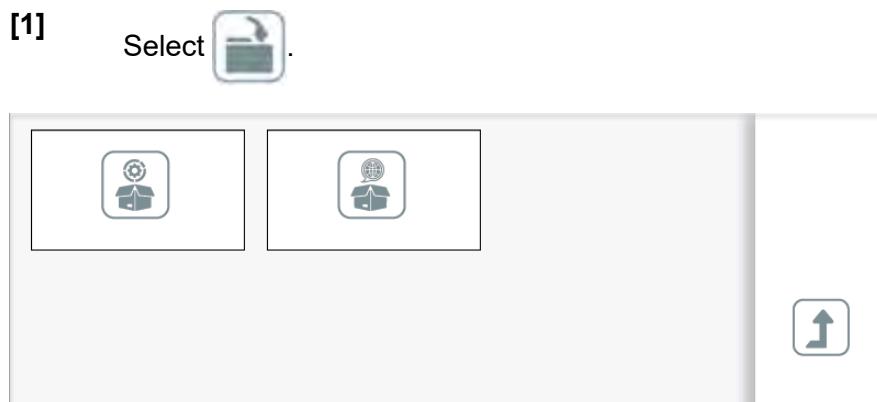
The new version of the language package replaces the existing version.

This procedure shows how to update the language package.

Requirements

- Service login
→ *Section 7.2 “Logging in as Service”, p. 200*
- The USB stick with the language package, placed in the *languages* folder, is plugged to the BPS C5

Procedure



[3] Select the desired language package.



Result

⇒ After installation, you will receive the following message:
_ Installation Status: Successful

7.15 System Testing

In the menu, you can test the electrical and electronic component:

- PD Calibration value
- Map test
- Transport speed
- Singler speed

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- Gate switching time
- Single home position

System testing is performed during maintenance.

Test Result	Symbol
Success	
Failure	
Warning	

This procedure shows how to perform system test.

Requirements

- Service login
→ *Section 7.2 “Logging in as Service”, p. 200*

7

Procedure

- [1] Select 
- [2] Check the **Status** tab.
- [3a] If the test result is success, select  to go back to the service menu.
- [3b] If the test status is red/yellow, select  to check the details.

Result

- ⇒ The test status of the individual component is displayed.
Take a service action accordingly.

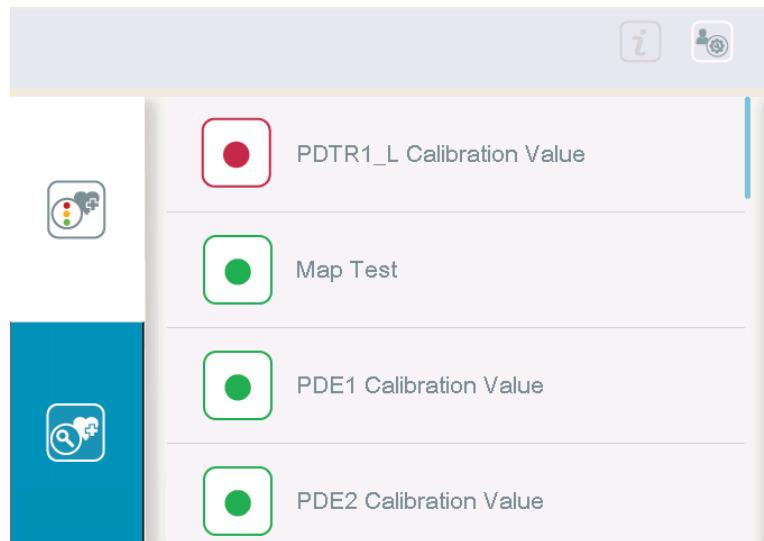


Figure 122: System Test Details

7.16 Exporting Raw Data

7

- Requirements**
- USB stick plugged into the BPS C5
 - Process banknotes as desired

Procedure

- [1] Log in.
→ *Section 7.2 “Logging in as Service”, p. 200*
- [2] Select 
⇒ You will receive the success message.
- [3] Select 

- Result** ⇒ Raw data is exported to the USB stick.

7.17 Copying Log Files to USB Stick

You can create troubleshooting traces and logs, and transfer the logs to a USB stick plugged. The log contains the data of the current software status.

This procedure shows how to copy dump logs to a USB stick.

- Requirements**
- USB stick plugged to the BPS C5

Procedure

- [1] Log in.
→ *Section 7.2 “Logging in as Service”, p. 200*

- [2] Select .

⇒ Following message is displayed:
Logs extraction successful

- [3] Select .

Result

- ⇒ The troubleshooting traces and logs are created, and transferred to a USB stick

7.18 Setting the Trace Level

The **Trace Level** menu option is used to set the level of details to be included in the dump logs for the DP (data processing) software.

The default trace level setting is **ERROR**. The trace level can be changed as required depending upon the issue that will be analyzed. However, the changes will be valid only till the BPS C5 is shutdown. The trace level changes to the default value on restart.

7

There are three levels:

- **ERROR**
- **INFO**
- **DEBUG**

The trace logs are used for debugging the DP software.

This procedure shows how to set the trace level.

Requirements

- Service login
→ *Section 7.2 “Logging in as Service”, p. 200*

Procedure

- [1] Select .



[2] Select the level as desired.

[3] Select .

Result

⇒ The trace level setting is updated.

7

7.19 Setting the Self Test Level

The **Sensor Self-Test Level** menu option is used to set the severity level of the dump logs for the sensor software. These logs are used to debug any sensor software-related errors.

The default self-test level is **Default**. The self-test level can be changed as required depending upon the severity of the issue that is being analyzed.

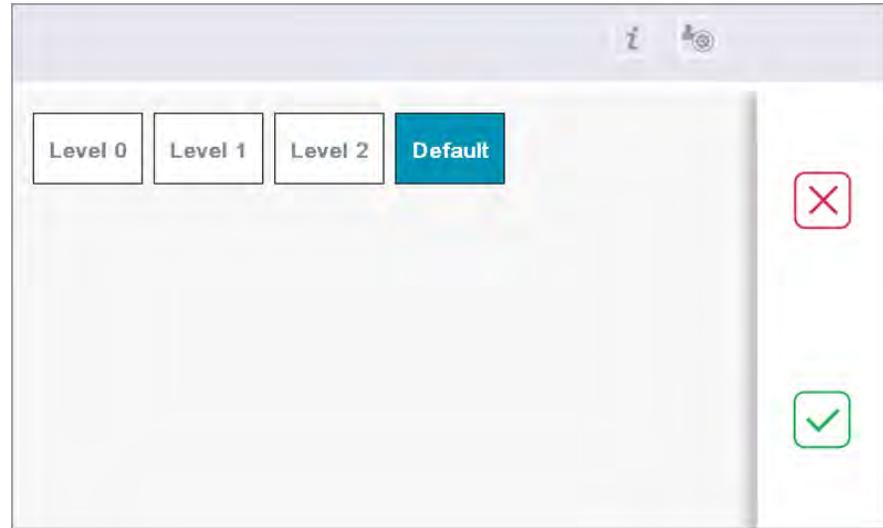
This procedure shows how to set the self-test level.

Requirements

- Service login
→ *Section 7.2 “Logging in as Service”, p. 200*

Procedure

[1] Select .



[2] Select the desired test level as desired.

[3] Select .

Result

⇒ The self-test level has been set.

7

7.20 Backup and Restore Using SD Card

You can take the backup of BPS C5 data on SD card and restore it in case data processor failure.

Data processor application generates backup on SD card under the following scenarios:



Figure 123: SD card on Data Processor

- Every safe shutdown of the BPS C5

- Post successful installation of software update
- Post successful installation of configuration package update
- Post successful installation of language update

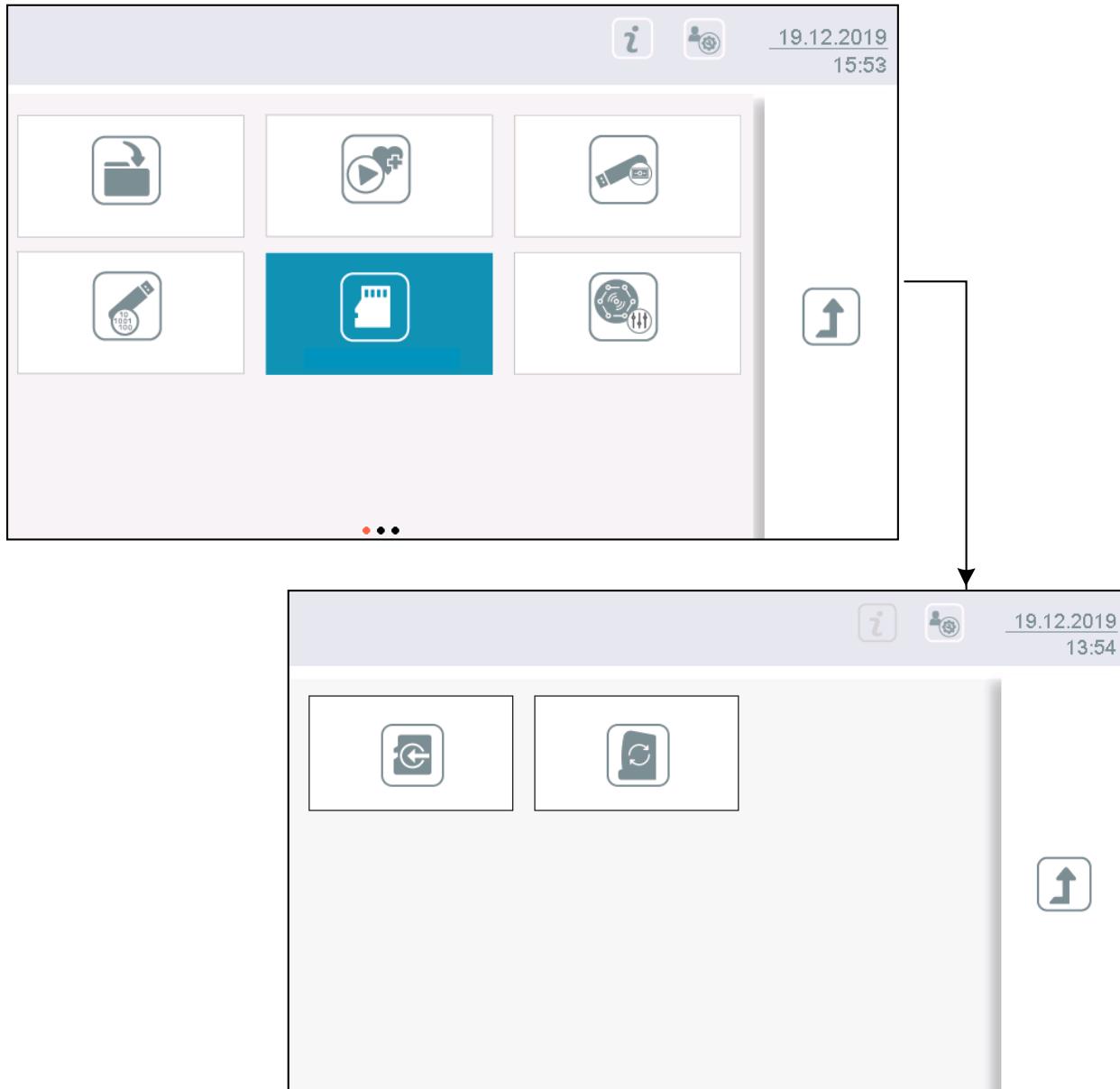


Figure 124: SD Card Manager

If there is software failure, you can bring up the BPS C5 with the version of the software that is installed previously and then restore the data backup from the SD card.

You can retain the BPS C5 specific data on the SD Card:

- Global Banknote counter
- Transport on time
- Singler on time
- Power on time
- Machine serial number
- Reports data
- All system settings
- Threshold and switch settings

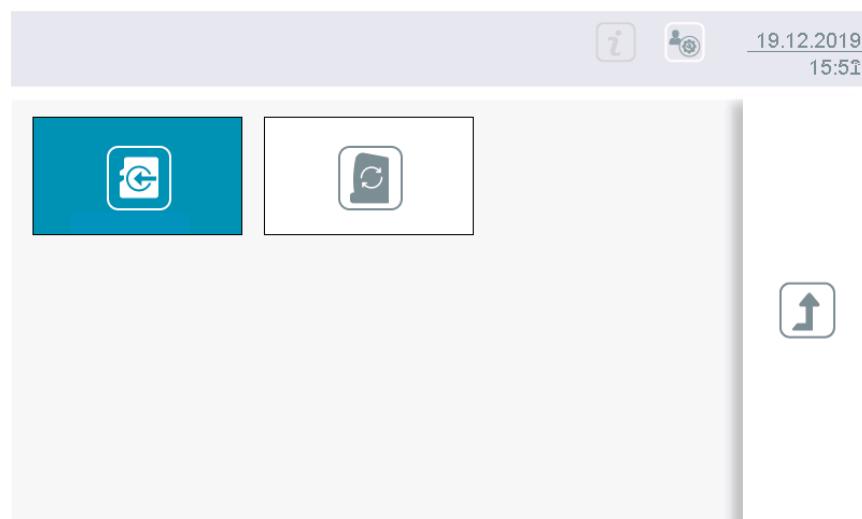
7.20.1 Generating a Backup on the SD Card

Requirements

- SD card installed on the DP processor
- Technical Service login 

→ *Section 7.2 “Logging in as Service”, p. 200*

Procedure



[1] Select **SD Backup** tab from the window.

⇒ The BPS C5 data is transferred to the SD card.

[2] Select .

Result

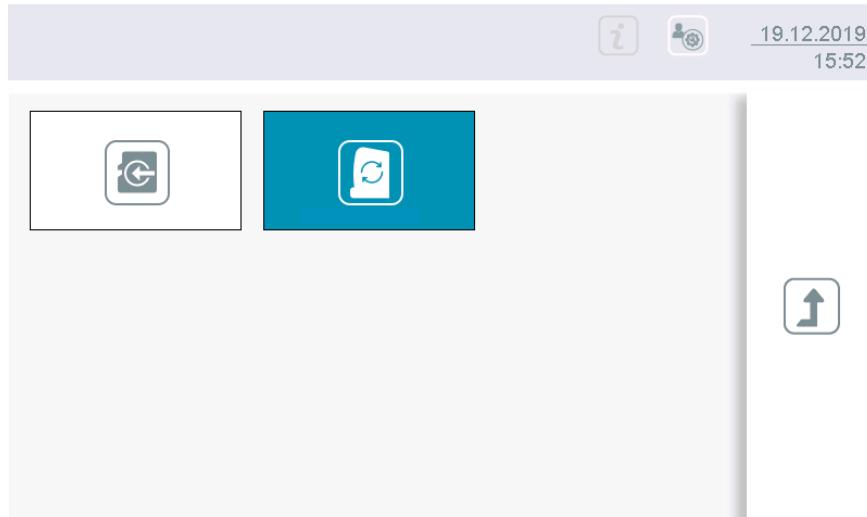
⇒ You have successfully generated the data backup on the SD card. The following message is displayed: **SD card backup successful!**

7.20.2 Restoring Backup from the SD Card

Requirements

- SD card installed on the DP processor
 - Service login 
- *Section 7.2 “Logging in as Service”, p. 200*

Procedure



- [1] Select **SD Restore** from the window.
 ⇒ The SD card backup data is transferred to the DP processor.

- [2] Select .

Result

- ⇒ You have successfully restored the backup data from the SD card. **SD Restore**.



Important!

To avoid data loss, restore the backup whenever any of the following service actions are performed:

- Replacing the DP processor
- Installing the DP Fresh Cab

The BPS C5 automatically reboot after the restore is complete. The following message is displayed:

Do not power off. The machine is going to shut down now....

7.21 Performing Touch Calibration for the replaced Display

Overview

After replacing an old display with a new/other display, you are required to perform Touch Calibration.

Calibration is stored on the machine, but not on the display. Therefore Touch Calibration must be performed whenever the display is replaced in the following scenarios:

- Resistive display to capacitive display
 - Resistive display to resistive display
 - Capacitive display to capacitive display
 - Capacitive display to resistive display
- External USB keyboard is connected to the BPS C5

Requirements

Procedure

- [1] Restart the BPS C5 using the power switch.
- [2] Interrupt the boot-up procedure by pressing the **Enter** key.
⇒ The Boot Loader window appear

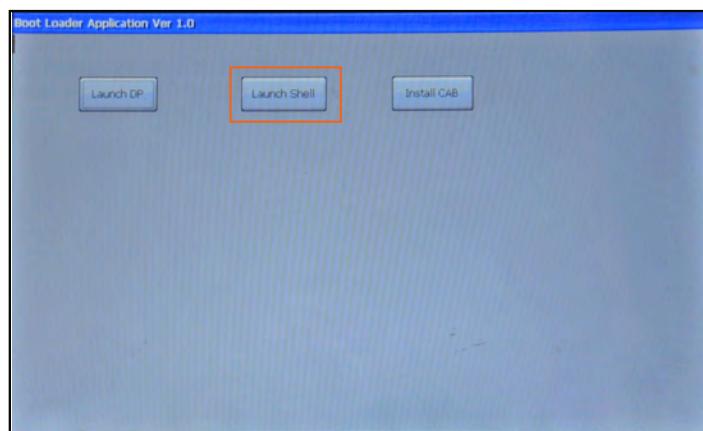


Figure 125: Boot Loader Window

- [3] Select the **Launch Shell**.
- [4] Select the **Command** menu.



[5] Select the **Touch Calibration** menu option.

⇒ The **Touch Calibration** window open with a "+" cursor.

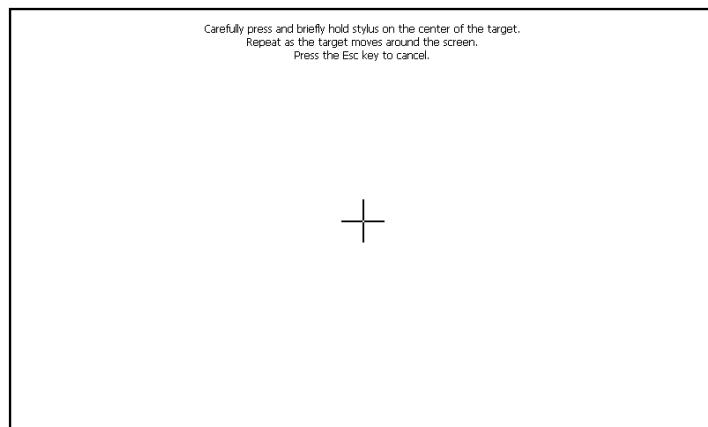


Figure 126: Touch Calibration Window

[6] Select as precisely as possible the exact center of the cursor as it appears on the window.

⇒ Cursor will move to different location, then repeat the above step again. The following window appears at the end of the calibration.



Figure 127: Touch Calibration Complete

- [7] Press the **Enter** button.
- [8] Restart the BPS C5 using the power switch.
- Result ⇒ The replaced display is calibrated successfully.

7.22 Configuring the Virtual Photo Detectors

7

The **Configure Virtual PD** menu allows you to adjust (lower) the threshold of consecutive blocked pixels needed to detect the presence of banknotes. By that, the false detection of leading and trailing edges is prevented. This adjustment is only necessary for the polymer banknotes with multiple transparent windows.

Requirements

- Keyboard connected to the BPS C5
- Service login
→ *Section 7.2 “Logging in as Service”, p. 200*

Procedure

- [1] Navigate to Screen 3.
- [2] Select .



- [3]** Set the desired **CamLBLeadingwitdth** and **CamLBTrailingwitdth** values.

For example, for CAD and AUD currencies, set both **CamLBLeadingwitdth** and **CamLBTrailingwitdth** to 10 mm .

The default value of both the parameters are 30. The width values can be changed within the range of 10 to 40, depending upon the size of the currency notes.

- [4]**

Select



Result



The virtual photodetector settings are updated successfully.

8 Preventive Maintenance

Maintenance includes cleaning and checking the BPS C5, as well as replacing worn-out parts.

Banknotes in circulation normally contain a high level of dirt that collects in the entire system as fine dust. Depending on the ambient conditions of the site, external influences can also lead to heavy soiling of the system.

Photo detectors and sensors are affected by soiling and the reject rate can increase.

To prevent malfunctions that are caused by soiling, it is recommended to clean the machine at regular intervals.

The cleaning in general has to be performed by the operator, see → *User Manual, section "Cleaning"*.

Any steps that are required for removing and replacing are described in the sections for parts replacement in this manual.

8.1 Maintenance Plan

Maintenance includes cleaning and checking the BPS C5, as well as replacing worn-out parts.

Before scheduling a preventive maintenance:

- Verify/Download any software/adaptation updates
- Ensure MTS calibration sheets and MTS cleaning liquid is on hand, as well as all tools required to complete work on the BPS C5
- Check for any Engineering Changes/Tech Bulletins pertaining to the machine and verify all required materials are on hand.
- Check **Details** to verify BPS C5 operation to date
- Verify if the BPS C5 is currently operating within expected operating parameters.
- Ask operator if they are experiencing any issues with the BPS C5 .
- Perform a visual inspection of the BPS C5, checking for any obvious problems (broken covers, unlevel installation, poor wheel-to-wheel contact in IM, etc).
- Verify the BPS C5 operation by running banknotes through the **Service Mode** menu.
→ *Section 7.8 "Testing the BPS C5 Transport and Singler Health", p. 210*

- Perform a System Test and verify both the initial and detailed results (in data log).
 - *Section 7.15 “System Testing”, p. 252*
- Verify Sensor Operation by performing a Sensor Functional Test.
 - *Section 7.10 “Testing the Sensor (Functional Test)”, p. 215*
- Perform General Service (clean and inspect the machine)
- Clean and Inspect:
 - Singler
 - Transport area
 - Wheels/Bearings
 - Gates
 - Belts
 - Pulleys
 - Sensors
 - Cables

8.1.1 Daily Maintenance Plan

8

The daily cleaning and maintenance work corresponds to the cleaning work described in the BPS C5 User Manual. Daily cleaning can also be performed by the operator.

The following areas should be cleaned during daily easy cleaning:

- Feeder area in the singler using cloth and brush
- Sensors using cloth and brush
- Transport area using cloth and brush
- Stacker modules using cloth and brush

8.1.2 Weekly Maintenance Plan

The weekly cleaning and maintenance work corresponds to the cleaning work described in the BPS C5User Manual. Weekly basic cleaning can also be performed by the operator.

The following areas should be cleaned during weekly basic cleaning:

- Feeder area in the singler using vacuum cleaner and brush
- Sensor area using cleaning liquid material
- Transport area using vacuum cleaner and brush

- Stacker modules using vacuum cleaner and brush

8.1.3 Quarterly Maintenance Plan

Quarterly maintenance (or as a guide after processing around 10 million banknotes) must be carried out by field engineers to check .

Check the basic function in system

- Extract dump logs
- Perform to analyze:
 - Singler health,
 - Rejection rate
 - Error log
- Check the BPS C5 using service tools, USB, laptop:
 - Latest version of Software
 - Banknotes sorting
 - Singler settings

8.1.4 Half-Yearly Maintenance Plan

Six-monthly maintenance (or as a guide after processing around 10 million banknotes) must be carried out by field engineers.

- Evaluate machine performance information using service tools, USB, laptop before disassembling the BPS C5
 - Extract dump logs
 - System test to analyse Singler health
 - Rejection rate,error log(frequent)
- Module wise deep cleaning with vacuum cleaner and leaning liquid material and brush.
 - Singler elements (Singler drum, Retarding wheel, hopper element,PDMSI, Toothed belt, Guide rollers, Transport Roller, Gear, Feeder Plate)
 - Rear Panel Top assembly - Guide rollers, PD - Service tools
 - Front Panel Top assembly - Drive rollers Service tools
 - Base Panel Top assembly - Guide rollers, PD Service tools
 - Main PCB, Power Supply and BASB Service tools
 - Sensor Module - Sensor scratches & Connectors '- Service tools - Cleaning liquid - Calibration Media - Laptop and USB
 - SDM H Unit,V unit and Stacker module

- Visual observation (Check and Replace)
 - Module wise (check for any wear and tear)
 - "Singler"- "" -Service tools
 - Rear Panel Top assembly - Guide rollers, PD - Service tools
 - Front Panel Assy - Toothed wheels and Belts, Drive roller, Gate Diverter, Guide plate - Service tools
- Perform diagnostic tests:
 - Check if the latest version of software is installed.
 - Check the banknote sorting
 - Singler setting

8.2 Cleaning

To keep the machine in perfect condition and operating correctly, you must clean the machine at regular intervals.

Take note of the following recommendations depending on the banknote quality and application:

- Clean once a day
- Clean when looking soiled

Always switch off the machine before cleaning it.

The dust tray is at the bottom of the machine.



Important!



DANGER

Danger of electric shock

Danger of death or serious injury from electric shock

1. Before starting any work, switch off the machine/device.
2. Disconnect the machine from the power supply.
3. Secure the machine/device against being switched back on.

Note also the following safety warnings.



DANGER

Danger of electric shock

Danger of death or serious injury from electric shock

Only field engineers are permitted to remove panel sections screwed in place on the machine/device.



WARNING

Do not perform any maintenance and service work.

There is a danger of serious injury.

Have maintenance and service work carried out by specially trained maintenance personnel and field engineers.



CAUTION

Danger from raised dust

Inhaling dust can be hazardous to your health.

Dust in the air can also damage bearings and electronic parts.

Use a vacuum cleaner with a micro-filter.

Never use compressed air for cleaning purposes.



NOTICE

Incorrect cleaning materials

Risk of damage to the machine/device

Do not use cleaning material with a corrosive or scouring effect.



NOTICE

Contaminated cleaning cloth

Risk of damage to the measurement window

Always use a new cleaning cloth. Grit contamination from previous cleaning may damage the measurement window.

Use each cleaning cloth once only.



Important!

Ensure that no fluid leaks into the inside of the machine.

Cleaning Aids

Use the following tools for cleaning:

- Commercially available cleaning solutions
- Clean, lint-free cloths (for cleaning and drying)
- Cleaning set MTS (Art.-No. 518493001) for heavy soiling
- Commercially available vacuum device with micro filter

To clean the machine, proceed as follows:

Procedure

- [1] Switch off the machine.
 → *Section 5.1.1 "Switching BPS C5 On and Off", p. 63*

**DANGER**

Danger of electric shock

Danger of death or serious injury from electric shock

Always unplug the machine by pulling on the plug and never by pulling on the cable.

- [2] Unplug the mains plug from the power socket.

- [3] Check the machine for damage.

**Important!**

If safety-relevant damage is visible (damaged or broken network cables or plugs, sharp-edged parts) contact your service partner or local service organization.

- [4] Thoroughly wring out the moistened cleaning cloth.

Cleaning Machine

- [5] Clean the housing with circular movements.

- [6] Remove the cleaning fluid with a clean, damp cloth.

- [7] Dry the housing with a clean, dry cloth.

Cleaning the Transport Section

- [8] Open both transport sections.

→ *Section 5.1.2 "Opening and Closing BPS C5", p. 64*

- [9] Remove the dust using a cleaning cloth.

- [10] If the soiling is heavy, vacuum the banknote transport paths, singler area, and measurement windows. Do not blow conductive particles into the machine.

- [11] Clean the singler area with a clean, damp cloth.

- [12] Dry the singler area with a clean, dry cloth.

**Important!**

Use cleaning set MTS to remove heavy soiling.

- [13] Thoroughly wring out the moistened cleaning cloth.

[14] Clean the transport sections, rollers, and measurement window.

[15] Dry the transport section, rollers, and measurement window using a dry, lint-free cloth.

Cleaning the Sensor Area

[16] Clean both the sensor measurement windows (glass plates PIS1, PIS2, UV radiation) using the cleaning set.

[17] Clean the MTS roller if you observe dust accumulation.



Important!

Ensure that all parts are dry and without residues.

[18] Close the machine.

→ *Section 5.1.2.5 "Closing BPS C5", p. 69*

Result

⇒ The machine is cleaned.



Important!

With single-shift operation and normal operating conditions clean the machine once a day, or more frequently if needed.

8.2.1 Cleaning Display Module

8

This procedure shows how to clean the touchscreen display module.

Requirements

- Commercially available mild cleaning solutions
- Clean, lint-free clothes (for cleaning)



NOTICE

Incorrect cleaning materials

Risk of damage to the machine/device

Do not use cleaning material with a corrosive or scouring effect.

Procedure

[1] Switch off the BPS C5.

[2] If the touchscreen is soiled, first clean it with a clean, lint-free cloth.

[3] Apply a mild cleaning solution to a clean, lint-free cloth and carefully remove fingerprints and other residue.

**Important!**

Never apply sprays or cleaning fluids directly to the touchscreen.

Result ⇒ The display module is cleaned.

8.2.2 Cleaning Dust Tray

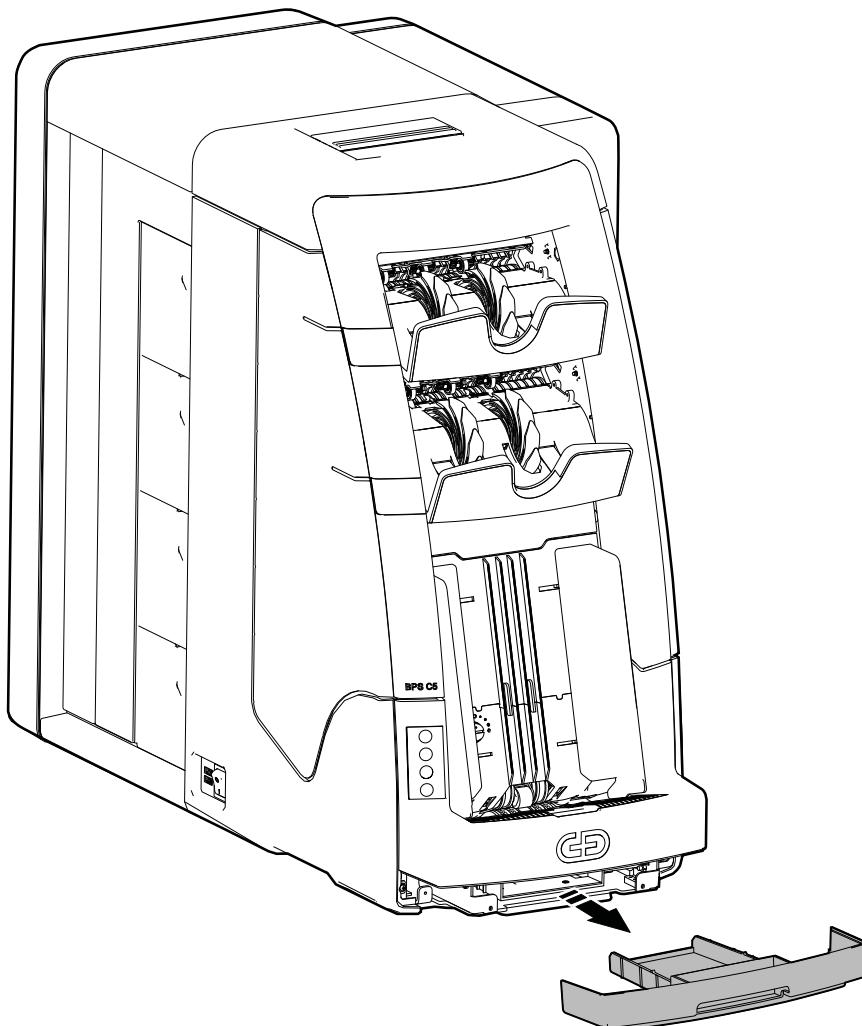
The dust tray, located at the bottom of the BPS C5, is a receptacle that collects all the dust from the machine.

You must clean the dust tray at regular intervals.

Requirements

- The BPS C5 is switched off.

→ *Section 5.1.1 “Switching BPS C5 On and Off”, p. 63*



[1] Remove the dust tray.

- [2] Empty the tray if it is full of dust.
 - [3] Remove the dust using a clean cloth.
 - [4] Reattach the dust tray.
- Result \Rightarrow The dust tray is cleaned.

8.3 Preventive Maintenance Workflow

Maintenance Workflow		
Software Version:		
OS Version:		
Database Version:		
Machine Control Software Version:		
Sensor Software Version:		
FPGA:		
Currency (ISO-Code) and Version		
1	4	7
2	5	8
3	6	9
General Overview		
Problems	Ask customer if there are currently any problems with the BPS C5.	
Optical test	Check general status of the BPS C5.	
Initial test	Test the BPS C5 with blanks\banknotes for correct operation before carrying out the strip down and service.	
System test	Run and check the result in dump log to analyse the machine status. → <i>Section 7.15 “System Testing”, p. 252</i>	
Transport/Singler Health Test	Test the transport and singler health by running some banknotes in the Service Mode . → <i>Section 7.8 “Testing the BPS C5 Transport and Singler Health”, p. 210</i>	

General Overview		
Test Sensor Functions	Run some test documents to check the sensor health status. → <i>Section 7.10 "Testing the Sensor (Functional Test)", p. 215</i>	
Last preventive maintenance start date/banknotes processed:		
Current preventive maintenance start date/banknotes processed:		
Next planned preventive maintenance start date/banknotes processed:		
General Service		
1	Remove all covers.	
2	Perform the cleaning and general maintenance task. → <i>Section 8.2 "Cleaning", p. 268</i>	
3	Vacuum the BPS C5 and inspect as per service details. → <i>Section 8.2 "Cleaning", p. 268</i>	
4	Install any software\adaptation updates as required. → <i>Section 7.14 "Updating the Software Manually", p. 236</i>	
5	Carry out the MTS calibration procedure, if required. → <i>Section 7.9 "Calibrating the Sensor - MTS (Mechanical Thickness Sensor)", p. 212</i>	
Singler Inspection		
1	Check friction roller of hopper assembly for wear and damage.	
2	Check the singler drum and hopper assembly for wear and damage.	
3	Replace any worn or damaged parts. → <i>Section 5.2 "Replacing Parts in the Singler Module ", p. 71</i>	
4	Perform the singler adjustment, if required. → <i>Chapter 6 "System Adjustment", p. 173</i>	
Transport Area Inspection		
1	Check the transport rollers for wear and damage.	
2	Check the shafts of all rollers for firm seating.	
3	Clean all the PDs.	
4	Replace any worn or damaged parts.	

Bearing and Bearing Housing Inspection

1	Check all bearings and bearing housings for wear and damage.
2	Make sure that the bearing housings are not damaged or cracked.
3	Check that the bearings are firmly seated and not worn.
4	Replace the roller unit if a bearing is exhibiting too much play.

Banknote Gates Inspection

1	Open and close the banknote gates manually to check that the mechanical function is correct.
2	Check that the banknote gates can move freely without hindrance.
3	Check and perform gate gap adjustment if required.

Toothed Belts Inspection

1	Check all the toothed belts for wear and tear.
2	Replace the worn out toothed belts.

Timing Belt Pulleys Inspection

1	Check all the timing belt pulleys for wear and tear.
2	Replace the worn out timing belt pulleys.

Sensors Inspection

1	Check the sensors for damage.
2	Check the measurement windows (glass plates) of the PIS and UV sensor for cracks and scratches.
3	Check the sensor for soiling behind the measurement windows.
4	Check all the electrical/sensor connectors.
5	Clean the connectors on the PCB side and flex cable connectors before installing.

Cable Connections Inspection

1	Check all the cables on the machine for damage.
2	Replace any chafed or kinked cables.

Software Diagnostics

1	Fit in all the cover elements.
2	Close the BPS C5.
3	Plug the power plug into the socket.

Software Diagnostics	
4	Switch on the BPS C5.
5	Use the menu to test the following: <ul style="list-style-type: none"> ● Singler transport and health ● Sensor functions
6	Run and compare the value with the test performed in the beginning of the maintenance workflow.

8.4 Cleaning Instructions for Mechanical Thickness Sensor (MTS)

Dust accumulation can reduce the life span of the mechanical thickness sensor. When sticky dust accumulates, the MTS rollers are damaged as the coating peels out.

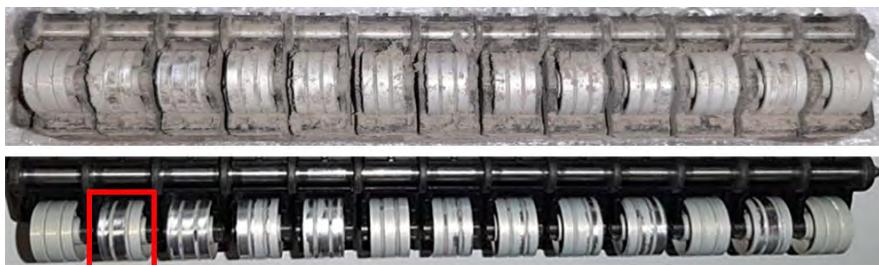


Figure 128: Worn out MTS Roller

The sensor assembly should be cleaned using a vacuum cleaner regularly (at least once a week).

For instructions, refer to the → 4 *Cleaning* section of the → *BPS C5 Service Manual*.

In addition, the MTS assembly should be thoroughly cleaned during:

- Every preventive maintenance
Preventive maintenance must be performed every six month or after running 20 million banknotes, whichever is earlier.
- Any corrective actions

Replace the MTS sensor parts , if the coating of the rollers are completely worn / peeled out .



Figure 129: Completely Worn out MTS Rollers

Requirements

- Laptop
- Vacuum cleaner

For cleaning, use the vacuum cleaner brush type shown in the image below.



Figure 130: Vacuum Cleaner Brush Type

- Upper sensor housing removed

For instructions, refer to the → 6.10 Removing the Upper Sensor Housing section of the → BPS C5 Service Manual.

- MTS assembly removed

For instructions, refer to the → 6.10.1 Removing the MTS section of the → BPS C5 Service Manual.

Procedure

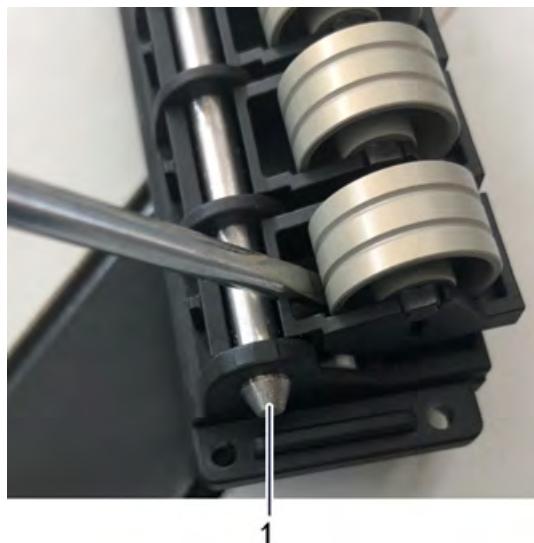
- [1] Remove all the rollers from the MTS assembly one by one.

To remove, carefully lever the single rollers out of the holder unit.

**Important!**

Ensure the following:

- Do not remove the metal rod (1).
- The axis of the roller should not slide/fall out. The assembly roller and the axis must stay together.
- All the rollers are removed.



8

- [2] Using the vacuum cleaner brush, clean all the rollers one by one.

Replace the damaged rollers with the new rollers.

⇒ Carefully clean the black plastic holders using the vacuum cleaner and a tool, for example, a screw driver as shown in the image below, to dig out the sticky dust.



Figure 131: Cleaning the MTS Rollers

**Important!**

Do not touch the ferrite core through the hole (2) at the bottom of the plastic housing.

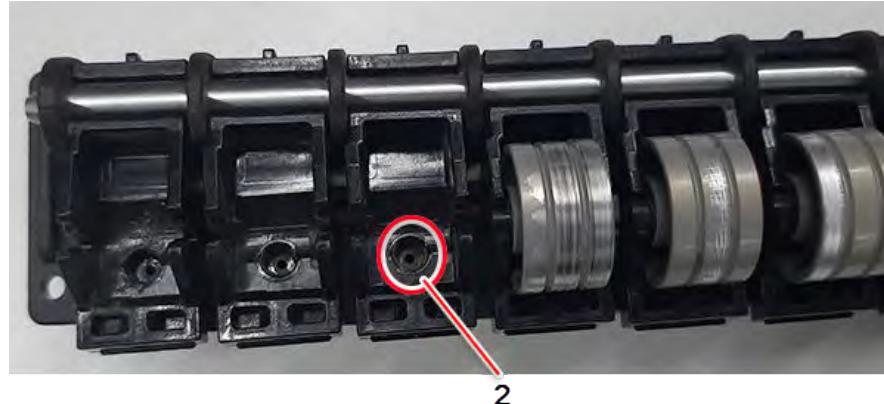


Figure 132: Ferrite Core Position

If the ferrite core becomes loose or falls out, the MTS may not function as desired.

- [3] Cleaning of the upper sensor housing using the vacuum cleaner.
For instructions, refer to the → *Cleaning* section of → *BPS C2 User Manual*.
- [4] Install the rollers one by one in the MTS assembly.
To install, place the assembled rollers in the position and press. Do not change the position of the rollers.
Ensure that the roller axis fits properly in the MTS assembly, not until you hear the click sound.



- [5] Install the MTS assembly in the upper sensor housing.
For instructions, refer to the → *6.10 Removing the Upper Sensor Housing* section of the → *BPS C5 Service Manual*.
- [6] Perform MTS Calibration

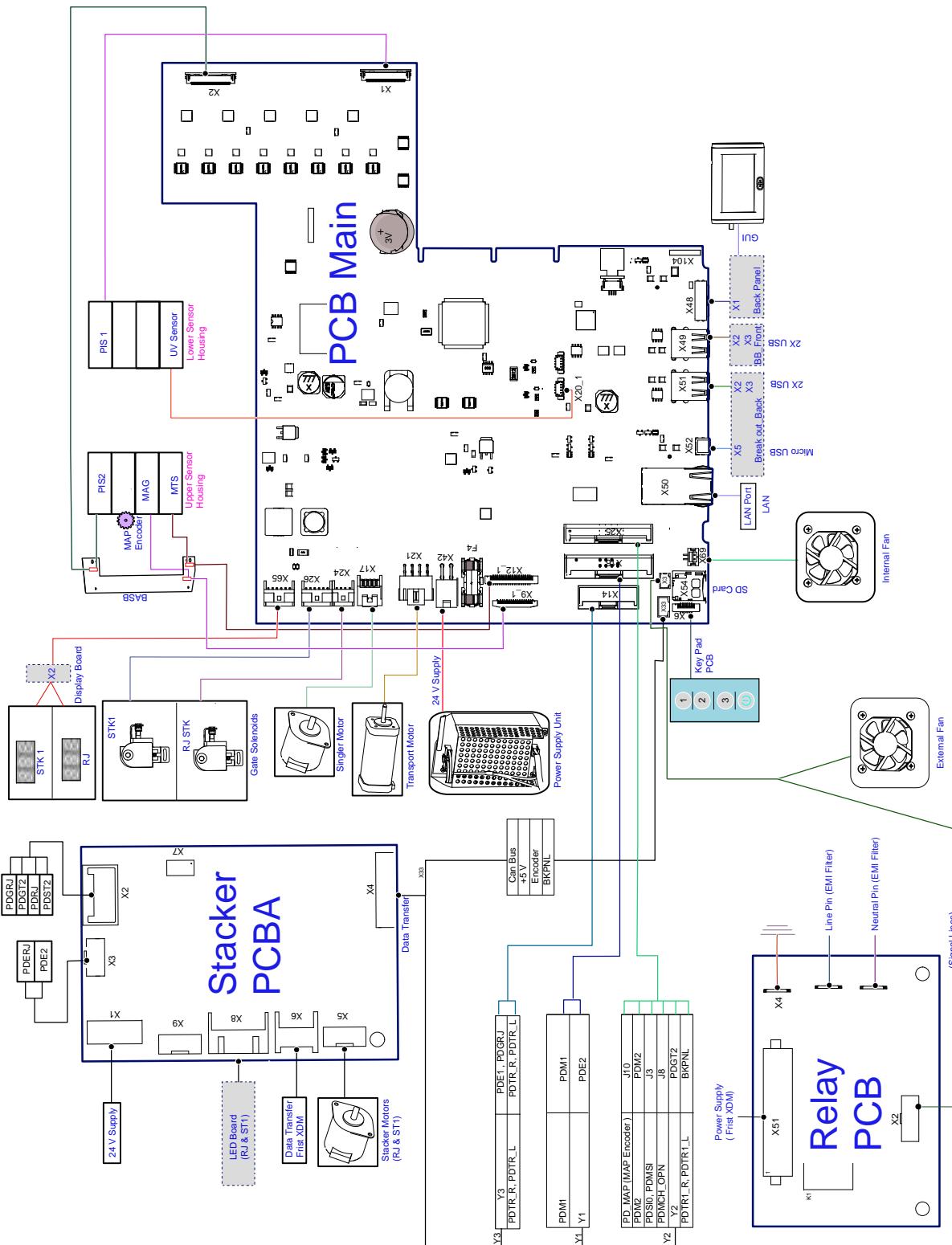
For instructions, refer to the → *9.9 Calibrating the Sensor - MTS (Mechanical Thickness Sensor)* section of the → *BPS C5 Service Manual*.



A Input Module - Electrical Cabling Diagram

A

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B Standard Delivery Module - Electrical Cabling Diagram

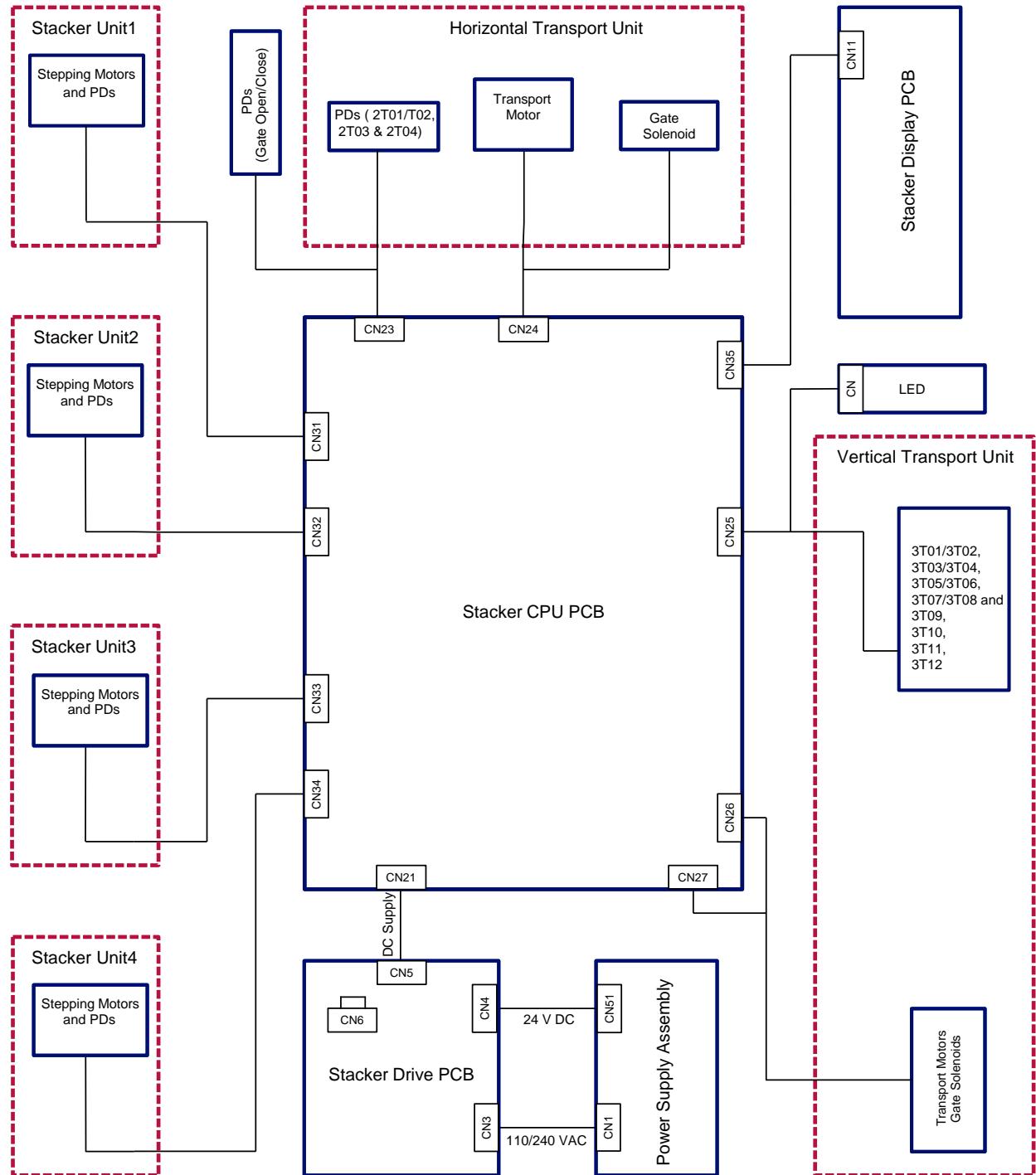


Figure 133: Standard Delivery Module Cabling Diagram

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C Input Module Error Codes Summary

Error Codes	Error Text / Possible Causes
EINI xxx	Startup (Boot Up Errors)
EPDT xxx	Photo detector errors
ESIN xxx	Singler area errors (motor, PDMS)
EREJ xxx	Reject stacker errors (gates, PDs)
EST1 xxx	Stacker 1 errors (gates, PDs, stacker display)
EST2 xxx	Stacker 2 errors (gates, PDs, stacker display)
EMCO xxx	Machine open errors
ETRP xxx	Transport speed errors
EPER xxx	Peripheral errors (printer, external display, bar code reader)
EDSP xxx	Display Errors
EUSB xxx	USB Interface Errors
EFTP xxx	FTP Interface Errors
EPOW xxx	Power supply errors
ETMP xxx	Temperature errors
ECOM xxx	Communication (LAN/CAN) related errors
ESYS xxx	General System Errors\Soft Errors

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Error Codes	Error Text / Possible Causes
E SWU xxx	SW & Config Update\ Upgrade errors
E SEN xxx	Sensor Errors

C

D Standard Delivery Module Error Codes Summary

Error Codes	Error Text / Possible Causes
E MOD 001 to 003	Motor speed error
E MOD 011 to 014	Gate error
E MOD 021 to 024	Stacker wheel blocked
E MOD 031 to 034	Pusher blocked
E MOD 041 to 044	Communication error
E MOD 051	Unexpected BN at xxx
E MOD 052	PD dark level when emitter on
E MOD 053	PD detects light when emitter off
E MOD 054	PD detects light always when emitter on/off
E MOD 055	Front or upper cover open
E MOD 056	PD detects remains BNs at xxx
E MOD 057	Notes fed time over between entrance side of PD and exit side of PD
E MOD 060	PD Counter is low between entrance side of PD and exit side of PD
E MOD 061	PD detects wrong size (Short edge side) of notes at PD XX
E MOD 071	PD detects wrong size (Short edge side) of notes at PD XX
E MOD 081	FW Empty, FW is not installed

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Error Codes	Error Text / Possible Causes
E MOD 083	CPU Over flow
E MOD 084	Main PCB Error
E MOD 085	ETC / EEPROM Memory Save Error
E MOD 208	Fail safe error
E MOD 302	Unexpected Banknote Placed / removed at Stacker XX

E Input Module - Belts Overview

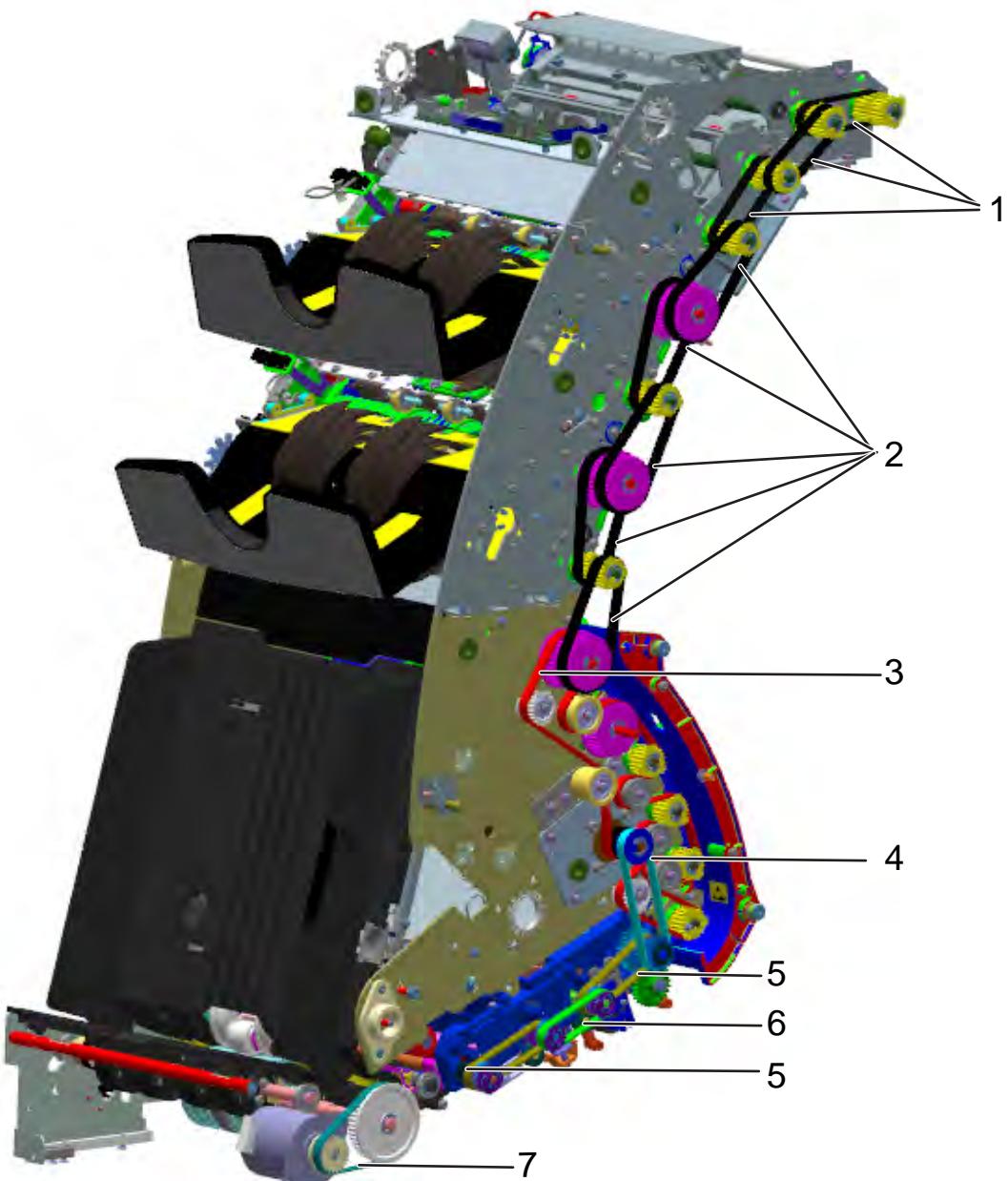


Figure 134: Input Module Belts

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SL.No	Description
1	Belt L=150 B=6 Pitch
2	Tooth Belt L=192 B=6
3	Tooth Belt L=786 B=6
4	Tooth Belt L=198 B=6
5	Tooth Belt GT3-150-2MGT-6
6	Tooth Belt GT3-130-2MGT-6
7	Tooth Belt L=195 B=6

F Standard Delivery Module - Belts Overview

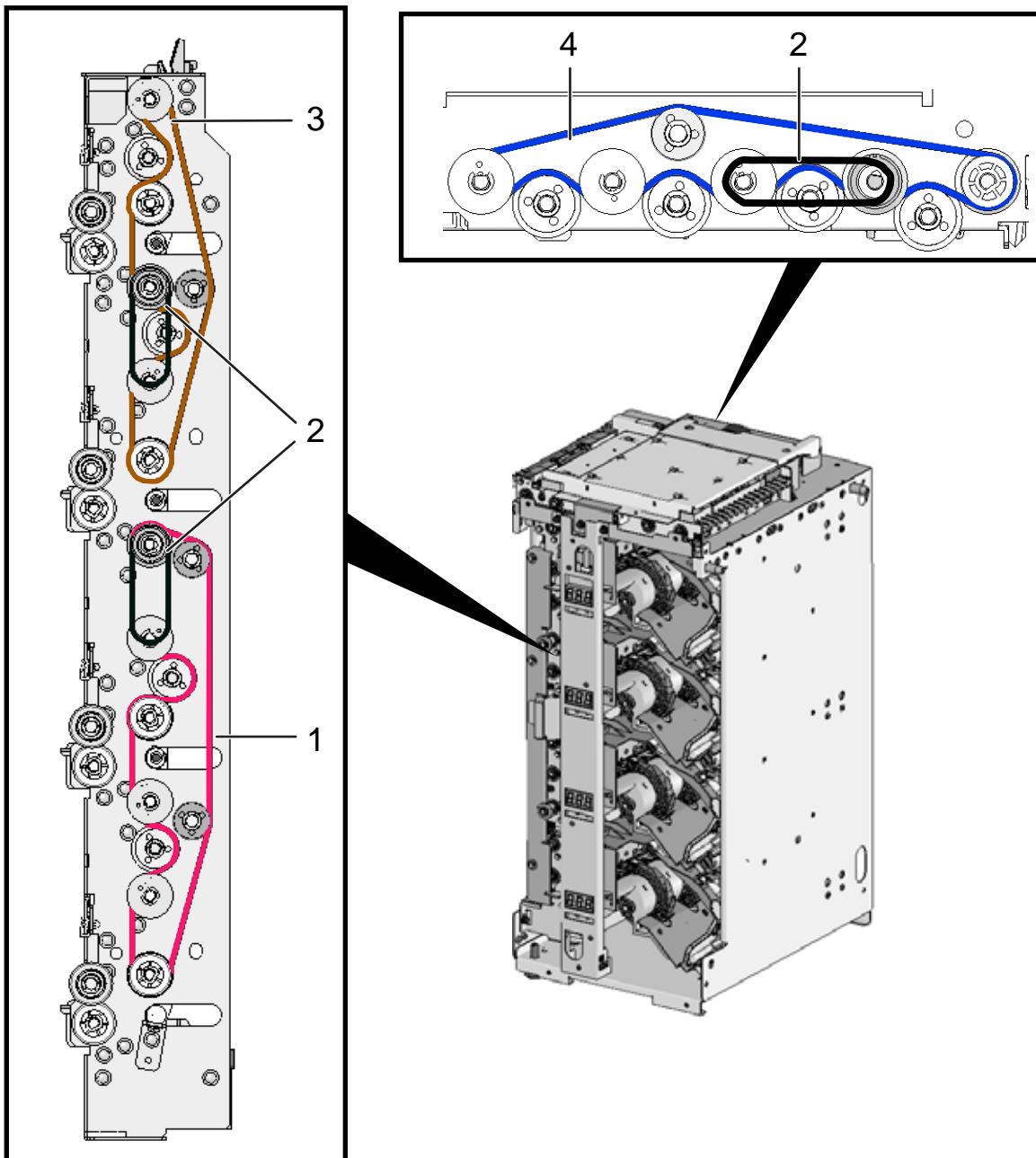


Figure 135: standard Delivery Module Belts

Item No	Description
1	Timing Belt L=582 B=6

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Item No	Description
2	Timing Belt L=141 B=6 3GT
3	Timing Belt L=480 B=6 3GT
4	Timing Belt L=447 B=6 3GT

G Input Module - Pulleys Overview

You will find pulleys on the RHS of the input module.

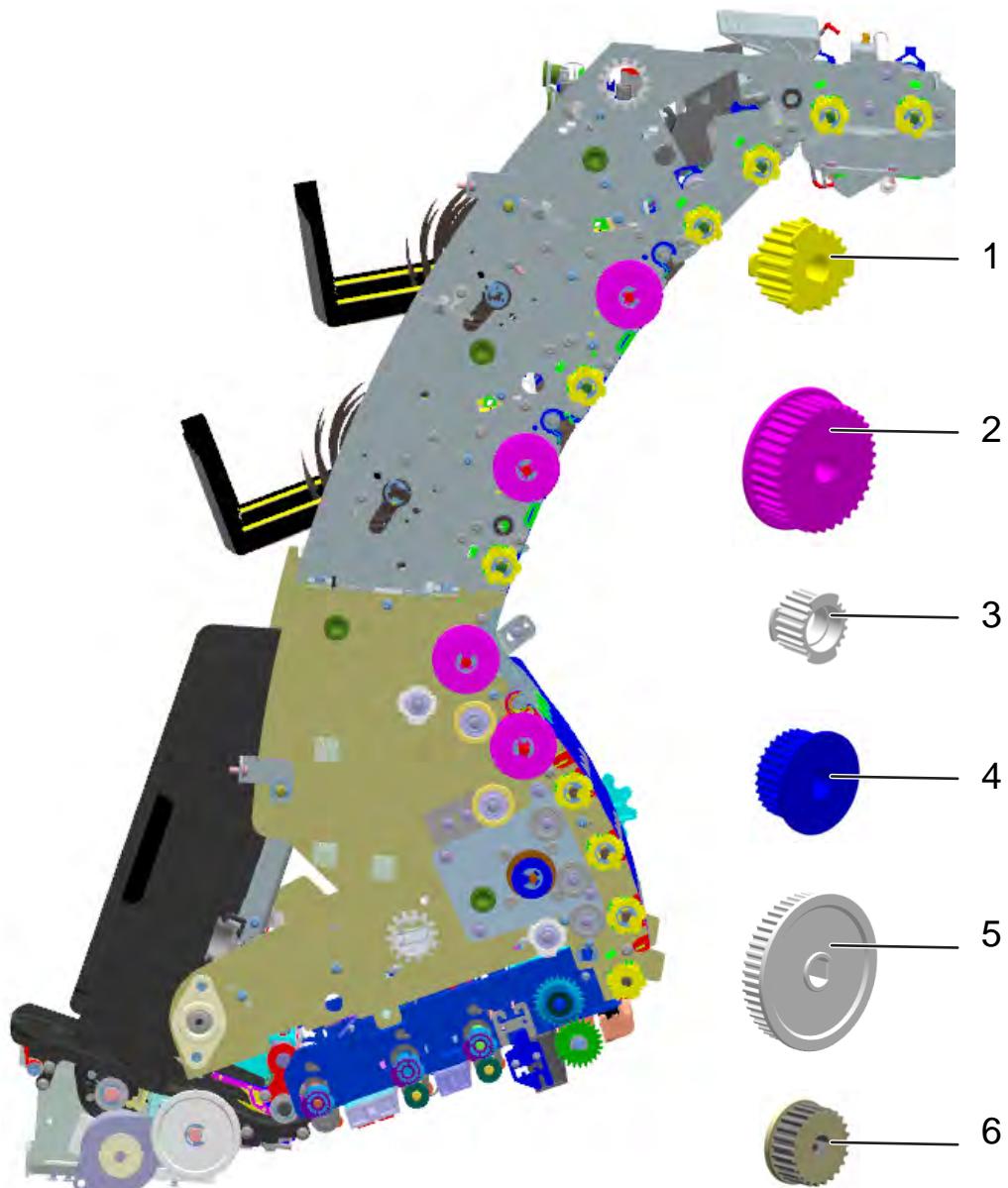


Figure 136: Input Module Pulleys

Item No	Description
1	Timing Belt Pulley 20 G
2	Timing Belt Pulley 35G 3P

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Item No	Description
3	Idler Pulley 20 G 3P
4	Timing Belt Pulley 30G 2P 10.2W
5	Timing Belt Pulley 35 G 3P
6	Timing Belt Pulley 20 G

H Reports

The following table lists all available reports.

Type of Report	Accessibility	Report Content
Deposit report	Operator	Accounting of the deposit with date, accounting period, sorting criteria (if set), expected value, information on non-recognized banknote, for each issue.
Customer report	Operator	Account report with the accumulated processing data for the last customer's deposit: customer no., number and value of the processed banknote (total and per denomination) information about sorting for each issue.
Operator report	Operator, Supervisor	Statistics of the accumulated processing data for the last registered user: operator ID, number and value of the banknote processed (total and per denomination) and information about sorting for every banknote series.
Machine report	Operator	Statistics about the accumulated processing data for the machine (since the counter was last reset): Time of the last reset of the machine's accounting data, machine no., number and value of the banknote processed (total)

*The serial number reading options are not available in the USA/Canada.
**For CNY Only

Type of Report	Accessibility	Report Content
		and per denomination) and information about sorting for each issue.
XML deposit report	Operator	Report with date and time, time of processing of a customer, header card numbers, deposit IDs, denomination (for multi entries of the largest denomination), time of the deposit processing, information about whether there were any rejects.
Daily result	Operator, Supervisor	Report for daily result: Machine ID, generation time, start time of first deposit, end time of last deposit, reject rate, reject reasons, coin value, value of cashless deposit, deposit data (sorting criteria of quality, currency, denomination, number, value, rejects, destroyed banknote*), total deposit and sum, name of currency The report contains the difference since the last time a report was automatically generated. If the report is manually requested, it is not reset.
Sorting statistics report (ECB)	Operator	This report contains all the processing data required by ECB guidelines (denomination, number and total of
*The serial number reading options are not available in the USA/Canada. **For CNY Only		

Type of Report	Accessibility	Report Content
		notes accepted and rejected) since the last sorting statistic log printout.
Reject report	Service	Overview of the reject reasons that occurred during the banknote processing.
Version report	Service	Report with date and time for each version.
Service report	Service	Detailed report with the following information: <ul style="list-style-type: none"> • Sensor values • Version number of the installed adaptations • Reject rates of the relevant installed currency • Reject reasons • Sorting threshold number
Ticket Report	Operator	Report of ticket IDs, date and time, accounting period, header card number, deposit data, rejections, denomination, banknote series, value and number of banknotes, quality sorting criteria.
SN List*	Operator	This report contains the list of serial numbers of the processed banknote as recognized by OCR.
PBoC**	Operator	This reports contains the details of serial number of
<p>*The serial number reading options are not available in the USA/Canada.</p> <p>**For CNYOnly</p>		

Type of Report	Accessibility	Report Content
		CNY (Chinese Yuan) currency. The report contains all the reject reason.
*The serial number reading options are not available in the USA/Canada.		
**For CNY Only		

H

I Symbols Used

This chapter contains an overview of all the icons which appear on the user interface on the screen.

Symbol	Name	Symbol	Name
	Language		Skew
	Operator		Health
	Supervisor		Singler
	Service		Switches
	PIN		Software Package
	Cancel		Sensor Self-Test
	Ok		Trace Level
	Menu		System Test Fail
	Favorites		System Test status
	List		Status Pass
	Processing speed		Raw Data Capture
	INFO		IRT Settings

Symbol	Name	Symbol	Name
	Software Version		System Test
	Reporting		Install MTS Cal
	Export Logs		Service OpMode
	Export Raw Data		Coins
	Brightness		Logout
	Next		Summary
	Stackers		Reject/Unfit
	Details		Denomination
	Delta		Time
	Virtual Keyboard		Thresholds
	System Settings		Startup Errors
	Installation		Single Denomination OP Mode
	Reset		Print

Symbol	Name	Symbol	Name
	Operation Details		Minus
	Multi Denomination OP mode		Machine IP
	Machine ID		Language Package
	INFO		Plus
	Next		(S)FTP1
	(S)FTP2		(S)FTP3
	SNTP		Date/TimeFormat
	Strap Size active		Auto Install
	Counterfeit Rejects		3" Printer
	Server Status		Function Button 1
	Startup Errors		Function Button 2
	Peripherals		Function Button 3
	VSI Settings		Opemode Name

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Symbol	Name	Symbol	Name
	Opemode Number		Time Zone
	SD Card		Settings
	Export Config Package		Configuration Package
	Customer ID		Deposit ID
	Amount		Strap Size
	CheckTV		External Interfaces
	External Display		Flip image
	Grand Total		Banknote Display
	Banknote Data Storage		Configurable Hot Key
	Connect		Reject Count
	Reject Counterfeit		Reject Overrun
	Report Configuration		SD Restore
	Serial Number Storage		Serial Number Search List

Symbol	Name	Symbol	Name
	Serial Number Delete		Serial Number Search

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Glossary

C

CD	compact disk digital storage medium
----	----------------------------------------

D

DIN	German institute for standardization
DVD	digital versatile disk digital storage medium

E

EN	European standard
EU	European Union (since December 1, 2009)

F

FDP	fast deposit processing fast processing of deposit with predefined values
FPGA	field programmable gate array
FS	fail-safe fail-safe compartment or fail-safe module

G

GS	tested safety (Geprüfte Sicherheit) certification
GUI	graphical user interface

I

IEC	International Electrotechnical Commission
IM	input module
IR	infrared wave band with a wave length invisible for human eyes

L

LAN	local area network computer network limited to a company or campus site
LED	light-emitting diode

M

MAG	magnet sensor
-----	---------------

O

OCR	optical character recognition
OS	operating system

P

PC	personal computer
PD	photo detector

S

SDM	standard delivery module
-----	--------------------------

U

USB	universal serial bus
UV radiation	ultraviolet radiation electromagnetic radiation in the range between 100 nm and 400 nm

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Material: **522501011**

Service MANUAL BPS C5
 English 04/2021

Batch: NEW Origin: India



Qty.: 1 PC.

