HEALTHCARE
Imaging Services

Service Manual

Document No: DD+DIS378.05E

CR 85-X
Type 5148/100

CR 75.0
Type 5146/105
(as of SN ≥ 6000)

2nd Edition

CR 85-X
Type 5148/100

CR 75.0
Type 5146/105
(as of SN ≥ 6000)

CONFIDENTIALITY NOTE:
Use, dissemination, distribution or reproduction of this document by unauthorized personnel is not permitted and may be unlawful.

DOCUMENT CONTROL NOTE:
The controlled version of this document resides on MedNet. Any printed copy of this document is uncontrolled.
WARNING:
Improper operation or service activities may cause damage or injuries.

INSTRUCTION:
(1) Read the "Generic Safety Directions" document (see MEDNET GSO => General Info => Agfa HealthCare => Publications => Service Manual) prior to attempting any operation, repair or maintenance task on the equipment.

(2) Strictly observe all safety directions within the "Generic Safety Directions" and on the product.
 Purpose of this document

This document provides information on the structure and contents of the Service Manual.

Document History

<table>
<thead>
<tr>
<th>Edition Revision</th>
<th>Release Date</th>
<th>Changes compared to previous version 1.0</th>
</tr>
</thead>
<tbody>
<tr>
<td>2.0</td>
<td>02-2007</td>
<td>Only layout changes as this Service Documentation is also valid for CR 75.0 Type 5146/105 (as of SN ≥ 6000).</td>
</tr>
</tbody>
</table>
# Chapter Overview

<table>
<thead>
<tr>
<th>Chapter</th>
<th>Title</th>
</tr>
</thead>
</table>
| 0       | Order List  
About this Manual |
| 1       | Controls, Connections and Set Up Procedures  
Site and System Data / Installation Report |
| 2       | Functional Description |
| 3       | Repair and Service |
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| 3.2     | Machine specific Tools, Software Tools and Auxiliary Equipment |
| 3.3     | Troubleshooting |
| 3.4     | Electrical and Mechanical Codes, Fuses, LEDs |
| 3.5     | Replacement of Parts |
| 3.6     | Adjustments and Calibrations |
| 3.7     | Software Menus and Setting |
| 3.8     | Software Releases, Patches |
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| 4       | Reference and Circuit Diagrams |
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| 9       | Maintenance |
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Explanation of notes

This documentation uses:

Safety relevant notes

<table>
<thead>
<tr>
<th>Icon</th>
<th>Signal Word</th>
<th>Situation</th>
</tr>
</thead>
<tbody>
<tr>
<td>!</td>
<td>CAUTION:</td>
<td>Possible dangerous situation: Light injuries or damage to the equipment described in the manual and/or damage to any other equipment or goods and/or environmental pollution can be the consequence.</td>
</tr>
<tr>
<td>!</td>
<td>WARNING:</td>
<td>Dangerous situation: Potential serious injury to a user, engineer, patient or any other person and possible mistreatment of patients can be the consequence.</td>
</tr>
<tr>
<td>!</td>
<td>DANGER:</td>
<td>Direct, immediate danger: Death or serious injuries can be the consequence.</td>
</tr>
</tbody>
</table>

Not-safety relevant notes

<table>
<thead>
<tr>
<th>Icon</th>
<th>Name</th>
<th>Type of Information</th>
</tr>
</thead>
<tbody>
<tr>
<td>📚</td>
<td>INSTRUCTION:</td>
<td>Indicates an instruction where it is important to follow literally the described actions.</td>
</tr>
<tr>
<td>🔍</td>
<td>IMPORTANT:</td>
<td>Highlights very important actions which have to be carried out to prevent malfunction.</td>
</tr>
</tbody>
</table>
| ✔    | NOTE:     | • Indicates advice to facilitate the following step or action without having a direct influence on the step or action.  
          • Highlights unusual points  
          • Indicates background information  
          • Can be used to explain or highlight displays of the graphical user interface. |

Conventions

<table>
<thead>
<tr>
<th>Actions</th>
<th>Way of writing</th>
<th>Sample</th>
</tr>
</thead>
<tbody>
<tr>
<td>Action, explanation</td>
<td>Switch the machine on</td>
<td>Switch the machine on</td>
</tr>
<tr>
<td>Action with the mouse or the &quot;Return&quot; key</td>
<td>&lt;omni-cd.exe&gt;</td>
<td>Double-click the &lt;omni-cd.exe&gt; icon</td>
</tr>
<tr>
<td>Required text input via the keyboard</td>
<td>vips</td>
<td>Enter vips and click on &lt;Continue&gt;</td>
</tr>
</tbody>
</table>
1 About this Manual

2nd Edition CR 85-X Type 5148/100 – CR 75.0 Type 5146/105
Service Documentation (DD+DIS378.05E)

IMPORTANT:
The 2nd Edition of the Service Documentation for CR 85-X Type 5148/100 and CR 75.0 Type 5146/105, DD+DIS378.05E is valid for:
- CR 85-X – Type 5148/100
- CR 75.0 – Type 5146/105 (as of SN ≥ 6000)

Explanation:
The improved detector unit (light guide and photomultiplier) from CR 85-X Type 5148/100 is integrated in CR 75.0 and hence the new subtype CR 75.0 Type 5146/105 has been created.
The improvement is not available for:
- ADC Compact Plus Type 5146/100
- CR 75.0 Type 5146/101
- Centricity CR MP3510 Type 5146/200 and 201

The Digitizer CR 75.0 Type 5146/105 has been introduced in production and can be distinguished from ADC Compact Plus Type 5146/100, CR 75.0 Type 5146/101 and Centricity CR MP3510 Type 5146/200 and 201 by the type label:
- Type: 5146/105
- Serial Number SN: ≥ 6000

Note that the CR 85-X / CR 75.0 Type 5146/105 Service Documentation (DD+DIS378.05E) is not valid for:
- ADC Compact Plus Type 5146/100
- CR 75.0 Type 5146/101
- Centricity CR MP3510 Type 5146/200 and 201

For the ADC Compact Plus Type 5146/100, CR 75.0 Type 5146/101 and Centricity CR MP3510 Type 5146/200 and 201 only the CR 75.0 Service Documentation, DD+DIS002.04E and Spare Part List, DD+DIS007.04M must be used.
<table>
<thead>
<tr>
<th><strong>Reason for the 2nd Edition</strong></th>
<th>The 2nd Edition of this Documentation has been released due to the fact that the CR 85-X Service Documentation from now on is also valid for CR 75.0 Type 5146/105. Only the layout of the Service Documentation and product specific safety notes have been adapted. No other changes of the content have been made.</th>
</tr>
</thead>
</table>
| **Product Description**       | The CR 85-X Type 5148/100 digitizer is the follow-up model of the CR 75.0 Type 5146/100 digitizer. It has been designed for General Radiology environments and, particularly, for the CR Mammography 1C Solution. The main changes between CR 75.0 Type 5146/100 and CR 85-X Type 5148/100 are:  
  - Acrylic light guide with glued PMT (PhotoMultiplier Tube) is used instead of optical fibers. |
| **Download from MedNet**      | This Service Documentation is available on the MedNet GSO Library.  
  Path: Computed Radiography / CR Digitizers / CR 85-X |
| **Features of the Digitizer** | The CR 85-X Type 5148/100 (CR 75.0 Type 5146/105) scans the exposed CR image plate, converts the information into digital data and automatically transfers the image to the image processing station for further processing and visualization.  
  The digitizer requires but little manual interaction. All you have to do, after exposure and identification of the cassette, is to place it in the input buffer of the digitizer. You can deposit up to 10 cassettes of different sizes simultaneously in the input buffer.  
  The Digitizer takes in the cassettes one by one. The Digitizer reads the demographic data and routing information from the memory chip in the cassette, opens the cassette, removes the image plate and scans the latent image by means of a sweeping laser beam.  
  Once the image is digitized, the cassette is returned to the output buffer to be used for new exposures. After a full Digitizer cycle, the plate has turned 180° in the cassette.  
  Depending on the X-ray intensity which has affected the phosphor during the exposure, more or less light will be emitted during laser scanning. The light is converted into an electrical signal. This signal is then converted into a digital bit stream.  
  Once converted into digital form, the digitized image is transferred to the image processing station for further processing and visualization. |
Further features of the digitizer include:

- The digitizer permits assigning the status “emergency” to an image. An emergency image will be given priority by the image processing station.
- The digitizer permits re-erasing an image plate before re-using it. In specific cases, this is necessary to prevent ghost images caused by previous exposures or stray radiation from interfering with the image of interest. You can erase a batch of up to 9 image plates.

**Intended Use of the Digitizer**

This device must only be used to scan exposed X-ray cassettes, containing an erasable image plate (IP).

This device is part of a system, consisting of X-ray cassettes with erasable phosphor image plates, an identification station for the cassettes and a workstation where the resulting digital image information is further processed and routed.

It is intended that this device is only operated in a radiological environment by qualified staff.
Generic Safety Directions for HealthCare Imaging Products

Purpose of this Document

This Generic Safety Directions document comprises the general safety relevant information including relevant environmental and occupational safety instructions for the Service Engineer.

It is valid for all Agfa HealthCare Imaging Products and part of each Service Documentation as well as Installation Planning document.

The latest version is available via MedNet, GSO Library path:
General Info => Agfa HealthCare => Publications => Service Manual

Document History

<table>
<thead>
<tr>
<th>Edition. Revision</th>
<th>Release Date</th>
<th>Changes compared to previous Revision 1.2:</th>
</tr>
</thead>
</table>
| 1.3              | 07-2009      | • Updated table with laser classification to latest changes of the corresponding standard. See section 3.3.  
                    |              | • Added section Environmental and occupational Safety Instructions. See section 9.  
                    |              | • Added safety note concerning inroom installations of CR equipment and corresponding X-ray shielding. See section 17.  
                    |              | • Added laser safety note and safety note concerning electrical checks after repairs. See section 19.  
                    |              | • Added treatment for Lithium batteries in sections 19 and 21.  
                    |              | • Updated information concerning the recycling pass. See section 24. |

Referenced Documents

<table>
<thead>
<tr>
<th>Document</th>
<th>Title</th>
</tr>
</thead>
<tbody>
<tr>
<td>Not applicable</td>
<td>Not applicable</td>
</tr>
</tbody>
</table>
WARNING:
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INSTRUCTION:
1. Read the "Generic Safety Directions" document (see MEDNET GSO => General Info => Agfa HealthCare => Publications => Service Manual) prior to attempting any operation, repair or maintenance task on the equipment.
2. Strictly observe all safety directions within the "Generic Safety Directions" and on the product.
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<td>SAFETY DIRECTIONS CONCERNING MODIFICATIONS</td>
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<tr>
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<td>28</td>
</tr>
</tbody>
</table>
1 Disclaimer

The installation and service of equipment described herein is to be performed by qualified personnel who are employed by Agfa HealthCare or one of its affiliates or who are otherwise authorized by Agfa HealthCare or one of its affiliates to provide such services.

Fitters, engineers and other persons who are not employed by or otherwise directly affiliated with or authorized by Agfa HealthCare or one of its affiliates are directed to contact one of the local offices of Agfa HealthCare or one of its affiliates before attempting installation or service procedures.

No part of this document may be reproduced, copied, adapted or transmitted in any form or by any means without the written permission of Agfa HealthCare.

Agfa HealthCare makes no warranties or representation, expressed or implied, with respect to the accuracy, completeness or usefulness of the information contained in this document and specifically disclaims warranties of suitability for any particular purpose.

Agfa HealthCare shall under no circumstances be liable for any damage arising from the use or inability to use any information, apparatus, method or process disclosed in this document.

Agfa HealthCare is not liable for resulting consequences, damages or injuries if you don’t operate the product correctly or if you don’t have it serviced correctly.

Agfa HealthCare reserves the right to change the product, the characteristics and its documentation without further notice to improve reliability, function or design.

NOTE:
In the United States, Federal Law stipulates that medical devices should only be sold to, distributed and used by or by order of a licensed physician.
# Used Icons

<table>
<thead>
<tr>
<th>Icon</th>
<th>Name and Circumstances</th>
</tr>
</thead>
<tbody>
<tr>
<td>!</td>
<td>CAUTION: Possible dangerous situation: Light injuries or damage to the equipment described in the manual and/or damage to any other equipment or goods and/or environmental pollution can be the consequence.</td>
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<tr>
<td>!</td>
<td>WARNING: Dangerous situation: Potential serious injury to a user, engineer, patient or any other person and possible mistreatment of patients can be the consequence.</td>
</tr>
<tr>
<td>!</td>
<td>DANGER: Direct, immediate danger: Death or heavy injuries can be the consequence.</td>
</tr>
<tr>
<td>![baby]</td>
<td>INSTRUCTION:</td>
</tr>
<tr>
<td></td>
<td>If used in combination with the warning or caution sign: Indicates a specific instruction, which if followed exactly, avoids the subject of the warning or caution.</td>
</tr>
<tr>
<td></td>
<td>If used without warning or caution sign: Indicates an instruction where it is important to follow literally as described.</td>
</tr>
<tr>
<td>![magnifying_glass]</td>
<td>IMPORTANT:</td>
</tr>
<tr>
<td></td>
<td>Highlights very important actions which have to be carried out to prevent malfunction.</td>
</tr>
<tr>
<td>![checkmark]</td>
<td>NOTE:</td>
</tr>
<tr>
<td></td>
<td>Indicates advice to facilitate the following step or action.</td>
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</tr>
<tr>
<td></td>
<td>Can be used to explain or highlight displays of the graphical user interface.</td>
</tr>
<tr>
<td></td>
<td>Is additional information without influence on the action or step!</td>
</tr>
</tbody>
</table>
3 Labels

3.1 CE Mark

| CE Mark | This product carries the CE Mark. The CE Declaration (CE Conformity) becomes invalid if the product is changed without explicit consent of the manufacturer! This applies to all parts, not only to safety elements. |

3.2 System Labels

All system labels and software version number locations are referred to within this service document in the appropriate section.
Enclosed an overview of common labels, according to ISO 3864.
This list is not complete.

- Hot Surface
- Laser Beam
- Magnetic Field
- Ionizing Radiation
- Obstacles
- Corrosive Liquid
- High Voltage
- Hand Injuries
3.3 System Labels concerning Laser Radiation

According to its classification, laser radiation can lead to eye and skin injuries. Each laser source is classified from class 1 to class 4, based on standard DIN EN 60825-1:2007. The table below lists the meaning of the different laser classes. Note the detailed instructions in the user manual and technical documentation.

<table>
<thead>
<tr>
<th>Class #</th>
<th>Meaning</th>
<th>Example Label</th>
</tr>
</thead>
<tbody>
<tr>
<td>Class 1</td>
<td>Not dangerous to the human eye, even when using optical instruments. Can nevertheless produce irritating effects, especially with low ambient light conditions.</td>
<td><img src="image" alt="CLASS 1 LASER PRODUCT" /></td>
</tr>
<tr>
<td>Class 1 M:</td>
<td>Not dangerous to the human eye if no optical instruments (magnifying glass or binocular) are used. Can nevertheless produce irritating effects, especially with low ambient light conditions.</td>
<td><img src="image" alt="LASER RADIATION&lt;br&gt;DO NOT VIEW DIRECTLY WITH OPTICAL INSTRUMENTS&lt;br&gt;CLASS 1M LASER PRODUCT" /></td>
</tr>
<tr>
<td>Class 2</td>
<td>Dangerous to the human eye for intentional staring into the beam. Not dangerous for short term exposure &lt; 0.25 seconds. Using optical instruments does not increase the risk of eye injury. Can even for short term exposure &lt; 0.25 seconds produce dazzling and irritating effects, especially with low ambient light conditions.</td>
<td><img src="image" alt="LASER RADIATION&lt;br&gt;DO NOT STARE INTO BEAM&lt;br&gt;CLASS 2 LASER PRODUCT" /></td>
</tr>
<tr>
<td>Class #</td>
<td>Meaning</td>
<td>Example Label</td>
</tr>
<tr>
<td>---------</td>
<td>------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------</td>
<td>--------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------</td>
</tr>
<tr>
<td>Class 2M:</td>
<td>Dangerous to the human eye when staring into the beam or when using optical instruments (magnifying glass or telescope). No hazard for short term exposure &lt; 0,25 seconds (aversion response of the eye) without use of optical instruments. Can produce dazzling and irritating effects even for short term exposure &lt; 0,25 seconds, especially at low ambient light conditions.</td>
<td><img src="image1" alt="Class 2M Laser Product Label" /></td>
</tr>
<tr>
<td>Class 3R:</td>
<td>Possibly dangerous to the human eye for direct view into the beam. Risks of an eye injury is increasing with duration of exposure. Can produce dazzling and irritating effects, especially with low ambient light conditions.</td>
<td><img src="image2" alt="Class 3R Laser Product Label" /></td>
</tr>
<tr>
<td>Class 3B:</td>
<td>Normally dangerous to the human eye for direct view into the beam. Viewing diffuse reflections is normally not dangerous. Risk of small skin injuries or ignition of explosive material if the power of the laser beam is close to the upper limits of class 3 B.</td>
<td><img src="image3" alt="Class 3B Laser Product Label" /></td>
</tr>
<tr>
<td>Class 4:</td>
<td>Dangerous to the human eye for direct view into the beam or viewing diffuse reflections. Very often class 4 lasers also implicate a fire hazard.</td>
<td><img src="image4" alt="Class 4 Laser Product Label" /></td>
</tr>
</tbody>
</table>
4 Product Complaints

Any service person who has any complaints or has experienced any dissatisfaction in the quality, durability, reliability, safety, effectiveness or performance of this product must notify Agfa HealthCare by the Agfa HealthCare complaint procedure. If the product malfunctions and may have caused or contributed to a serious injury of a patient or an accident or if there are any hazards which may cause an accident Agfa HealthCare must be notified immediately by telephone, fax or written correspondence to the following address:
Agfa Service Support - local support addresses and phone numbers listed on: www.agfa.com

Agfa – Gevaert N.V.
Septestraat 27
2640 Mortsel, Belgium.
Fax +32 3 444 4485

5 References

Technical Documentation is available via MedNet (PDF) and your local Agfa HealthCare support organisation (Paper).

Access to MedNet:
IntraNet:  http://docs.agfanet/bu/mi/mednet/mednetcso.nsf
6 Intended Use

This Agfa HealthCare product should only be operated in a hospital or clinical radiological environment by qualified staff.

It must only be operated according to its specifications and its intended use. Any operation not corresponding to the specifications or intended use may result in hazards, which in turn may lead to serious injuries or fatal accidents (for example electric shocks). AGFA will not assume any liability whatsoever in these cases.

Make sure that the product is constantly monitored in order to avoid inappropriate handling, especially by children.

The product must only be installed and put into operation under the specified conditions.

7 Intended User

This manual is written for Agfa trained Field Service Engineers and Clinical Application Specialists, trained users of Agfa HealthCare products and trained diagnostic X–Ray clinical personnel who have received proper training. Users are considered as the persons who handle the equipment as well as the persons having authority over the equipment.

8 Qualifications for Operation and Service Tasks

This Technical Documentation describes adjustments and routines which must only to be performed by qualified technical personnel.

The Agfa (trained) Field Service Engineers and Clinical Application Specialists must have received adequate Agfa HealthCare training on the safe and effective use of the product and applicable environmental and occupational safety matters before attempting to work with it. Training requirements may vary from country to country.

Agfa (trained) Field Service Engineers and Clinical Application Specialists must make sure that training is received in accordance with local laws or regulations that have the force of law.

Your local Agfa HealthCare representative can provide further information on training.
Environmental and occupational Safety Instructions

Each Agfa (trained) Field Service Engineer and Clinical Application Specialist:

- Must make his or her personal contribution to improve safety and protect the environment.
- When working on a customers site, has a duty to take reasonable care to avoid injury to himself or herself or to others who may be affected by their acts or omissions.
- Is obligated to adhere strictly to regulations and instructions.
- Shall familiarise himself or herself with the provisions of the Agfa Healthcare Health, Safety and Environment Policy and any specific rules or procedures relating to occupational safety at work and the protection of the environment.
- Shall promptly report any near misses, accidents, incidents or dangerous occurrences to their line manager and co-operate fully in any investigation.
- Shall co-operate with company management on matters relating to health, safety and environment and, where appropriate, discuss with and / or assist their manager in resolving matters relating to health, safety and environment.
- Shall ensure that any company equipment issued to them, or, for which they are responsible, is correctly used and properly maintained.
- Shall wear protective equipment whenever instructed or if it is recommended to do so.
- Shall be responsible for good housekeeping in the area in which he or she is working.
- Shall report situations, which could put them at risk, on either company or customers' premises, to their manager or supervisor; and, if warranted, directly and in confidence, to the Health and Safety Co-ordinator, Global HSE Manager, or ultimately to the Managing Director.
- Shall report any injuries, diseases or dangerous occurrences to his or her line manager.
- Shall report any accidents, incidents or near misses to his or her line manager.
- Shall report any situation of which he or she is aware that is potentially dangerous.
- Shall comply with any health surveillance procedure instituted for his or her benefit or for compliance with regulations.
10 Connections to other Equipment

Agfa HealthCare equipment must only be used in combination with other Agfa HealthCare equipment or components if these are expressly recognized by Agfa HealthCare as compatible. A list of such equipment and components is available from Agfa HealthCare service on request.

Changes or additions to the equipment must only be carried out by persons authorized to do so by Agfa HealthCare. Such changes must comply with best engineering practice and all applicable laws and regulations that have the force of law within the jurisdiction of the hospital.

The Agfa HealthCare products are designed to communicate with other devices in the hospital network using DICOM protocols.

Connections to other equipment:

Warning:

Accessory equipment not complying with the safety requirements of this product may lead to a safety hazard.

INSTRUCTION:

Consult the Technical Documentation before making any connections to other equipment.

Consideration relating to the choice of accessory equipment shall include:

- Use of the accessory equipment in the patient vicinity.
- Evidence that the safety certification of the accessory equipment has been performed in accordance with the appropriate IEC 60601-1 and IEC 60601-1-1 harmonized national standard.

In addition all configurations must comply with the medical electrical systems standard IEC 60601-1-1. The party that makes the connections acts as system Configurer and is responsible for complying with the systems standard.

If required, contact your local service organization.
11 Accessories and Spare Parts

Parts and accessories replacement:

**WARNING:**
Hazards may be introduced because of component failure or improper operation.

**INSTRUCTION:**
- Replace defective parts with Agfa HealthCare original spare parts.
- Use only tools and measuring instruments which are suitable for the procedure.
- Only approved Agfa HealthCare accessories must be used. For a list of compatible accessories contact your local Agfa HealthCare organization or www.agfa.com.

12 Compliance

**Directive for HealthCare Imaging Products:**

- **ANNEX I - ESSENTIAL REQUIREMENTS - GENERAL REQUIREMENTS** The products are designed and manufactured in such a way that, when used under the conditions and for the purposes intended and, where applicable, by virtue of the technical knowledge, experience, education or training of intended users, they will not compromise the clinical condition or the safety of patients, or the safety and health of users.

- **ANNEX II - EC DECLARATION OF CONFORMITY:** Full quality assurance system ISO 13485

- **ANNEX X - CLINICAL EVALUATION:** The clinical evaluation follows a defined and methodologically sound procedure.
Applied Standards for HealthCare Imaging Products

- IEC 60601-1, Ed. 3: Medical electrical equipment - Part 1: General requirements for basic safety and essential performance

- ISO 14971:2000, Medical devices – Application of risk management to medical devices

- IEC 60601-1-2, It specifies the MANUFACTURER of the ME EQUIPMENT or ME SYSTEM provides information to the RESPONSIBLE ORGANIZATION that is essential in determining the suitability of the ME EQUIPMENT or ME SYSTEM for the electromagnetic environment of use, and in managing the electromagnetic environment of use to permit the ME EQUIPMENT or ME SYSTEM to maintain BASIC SAFETY and provide its ESSENTIAL PERFORMANCE without disturbing other equipment.

Additional standards for documentation:

IEC 62079 Ed. 1: Preparation of instructions - Structuring, content and presentation

Harmonization:

Global Harmonization Task Force (GHTF) www.ghtf.org/

This document has been prepared to comply with Study Group 1 guidance document of the Global Harmonization Task Force (GHTF) www.ghtf.org/ to assist development of a consistent, harmonized definition for a medical device that could be used within a global regulatory model and would offer significant benefits to the manufacturer, user, patient or consumer, and to Regulatory Authorities and support global convergence of regulatory systems.

IECEE CB SCHEME

The IECEE CB (Certification Body) Scheme is the world’s first truly international system for acceptance of test reports dealing with the safety of electrical and electronic products. It is a multilateral agreement among participating countries and certification organizations. Agfa has produced a CB test report and claims national certification in all other member countries of the CB Scheme.

Details see www.ieCEE.org
Radiation of radio frequency:

**CAUTION: For USA only:**

This equipment generates, uses and can radiate radio frequency energy and, if not installed and used in accordance with the service manual, may cause interference to radio communication.

---

Note:

This product has been tested and found to comply with the limits for a Class A computing device pursuant to Subpart B of Part 15 of FCC Rules, which are designed to provide reasonable protection against such interference when operated in a commercial environment.

Operation of this equipment in a residential area is likely to cause interference.

The user will be required to take all necessary measures to correct the interference at his own expense.
13 Safety Directions for Operation

Accessibility of the mains power switch:

**CAUTION:**
Do not obstruct the mains power switch.

Position the Agfa HealthCare product so that it is possible to disconnect the mains power connection.

- Under certain conditions the Agfa HealthCare product will show a display containing a message. This message will show that either a problem or action has occurred or that a requested action is required or cannot be performed. The user must read these messages carefully they will provide information on what to do. This will be either performing an action to resolve the problem or to contact the Agfa HealthCare service organization. Details on the contents of messages can be found in this Technical Documentation.
- All images created using any image technology can show artifacts which could be confused with diagnostic information. If there is any doubt that the diagnostic information could be corrupted, additional investigations must be performed to get clear diagnostic information.
- Ventilation openings must not be covered.
- If you notice conspicuous noise or smoke, disconnect the product immediately from the mains.
- Do not pour water or any other liquid over the device.
- If a system malfunction causes an emergency situation involving the patient, operating personnel or any system component, activate the emergency stop for the system concerned. All motor driven system movements will be stopped.
- Do not store any magnetic media near or on devices, which produce magnetic fields, since stored data may be lost.

Explosive environment:

**DANGER:**
Risk of explosion.

Never operate this device in zones where there are flammable anesthetics or oxygen which may cause an explosion.
Usage of an un-interruptible power supply:

**Warning:**

*Images can be lost due to power failure.*

Connect the equipment to an un-interruptible power supply (UPS) or an institutional standby generator.

---

### 14 Radiation Protection

Only qualified and authorized personnel shall operate any X-Ray system. In this context qualified means those legally permitted to operate this X-Ray equipment in the jurisdiction in which the X-Ray equipment is being used, and authorized means those authorized by the authority controlling the use of the X-Ray equipment. Full use must be made of all radiation protection features, devices, systems, procedures and accessories.

Ionizing radiation can lead to radiation injuries if handled incorrectly. When radiation is applied, the required protective measures must be complied with.

---

### 15 Safety Directions for Cleaning and Disinfection

- Details about cleaning and disinfection or sterilization methods that may be used on SYSTEM parts or ACCESSORIES that can become contaminated through contact with the PATIENT or with body fluids, are referred to within the individual service documents.
- Disconnect the power supply from the equipment prior to cleaning the equipment.
16 General Safety Directions for Service Activities

- This system uses high voltage. Please consider the respective safety regulations.
- Electrical repairs and connections must only be performed by a qualified electrician.
- Mechanical repairs and connections must only be performed by a qualified technician.
- The safety directions for operation (see section 13) are also valid for all service activities.
- During all service activities observe prescribed local and country-specific requirements (e.g. occupational safety and accident prevention regulations).
- All existing screw connections must be tightened sufficiently firmly, but they may not be overstressed when tightening. There must always be compliance with stated torque values!
- Damaged or missing screws may be replaced only with the same screw types that have the specified hardness rating. Unless a different value is listed in the instructions, all Allen screws used must be hardness rated 8.8.
- All screws must be secured in accordance with the corresponding data. If "Loctite" has to be used to secure screws, this is stated in the text.
- Any Agfa service PC or tool which is to be connected via RS232, RJ45, USB or other interface to an Agfa device must not be connected to the mains but must be operated on its internal battery or indirect supply (low voltage).

- When handling printed circuit boards (abbr.: PCBs) the following points must be observed:
  - Always switch off the equipment and unplug the power cord, before you disconnect or connect cables on printed circuit boards.
  - When working on PCBs, always wear an anti-static wrist strap. Never touch any parts or components on PCBs with your bare fingers.
  - PCBs have to be kept or transported in their protection bags. Never carry a PCB without protection bag and walk on carpet or plastic floor covering (electrostatic charge).
  - Once the PCB is taken out of its protection bag, it has to be protected from electrostatic charge by a grounded mat.

Static discharge at electrical components:

**CAUTION:**

*Static discharge! Electrical components may be destroyed:*

For the repair on electrical components, wear a grounding strap (Order number: CM+9 9999 0830 0) around the wrist and connect the other end of this strap on a grounded conducting metal piece.
17 Safety Directions for Installation Planning Activities

Protecting CR (Computed Radiography) Equipment against scattered X-Rays:

**Warning:**

*Image plate is sensitive for X-rays. Poor image quality possible.*

The digitizer and the cassette storage shall be protected against X-ray radiation this way, that the annual dose equivalent at the installation place will not exceed 1 mSv.

Protecting Film-Screen Systems against scattered X-Rays:

**Warning:**

*Film is sensitive for X-rays. Poor image quality possible.*

The film-screen system shall be protected against X-ray radiation this way, that the annual dose equivalent at the installation place will not exceed 1 mSv.

Accessibility of the power disconnection device:

**Warning:**

*Electrical device. Shock possible.*

**INSTRUCTION:**

- Do not position Agfa EQUIPMENT so it is difficult to operate the disconnection device when an APPLIANCE COUPLER or separable plug is used as isolation.
- Local and International wiring regulations must be observed. Check all supplies and voltages, currents, trips and fuses with the Hospital facilities department or their engineers.
• The device complies with the EN 60601-1, 2006 standard for Information Technology. This means that, although it is absolutely safe, patients may not come in direct contact with the equipment. Therefore the operator console must be placed outside a radius of 1.5 m around the patient.

![Patient environment diagram]

• This device should be installed behind the institution firewall for network security and anti-virus protection. No ongoing computer virus protection or network security for this medical device is provided (e.g. a computer firewall). Network security and anti-virus provisions are the ongoing responsibility of the user or institution.

Fixing equipment at the wall or floor:

**Warning:**

**Unknown composition of wall or floor structure: Risk of injury or damage:**

Hospital management is responsible for the position, location and fixing of all equipment.

**Floor load:**

**CAUTION:**

**Heavy device may damage the floor covering.**

Make sure that the floor covering is solid enough to stand the weight of the device.

Fixing equipment at the ceiling:

**CAUTION:**

**Ceiling construction may be inadequate for fixing of equipment: Risk of injury or damage:**

Hospital management is responsible for the position, location and fixing of all equipment.
18 Safety Directions for Installation Activities

- If not otherwise stated, installation and configuration is performed by Agfa HealthCare trained personnel.
- If damage of the package is visible from the outside contact your local AGFA representative.
- Apart from wearing the required protective clothing, e.g. safety boots and gloves, care must be taken that heavy loads are correctly lifted/carried to avoid injury. The relevant instructions must be complied with. Heavy or awkward loads must be moved by mechanical means or by several people.
- When installing the product be sure that there is either a mains plug or an all-cable disconnecting device in the internal installation fitted near the product and that it is easily accessible.
- Defective covers, sharp edges or protruding parts of equipment can cause injuries, if accidentally knocked into. Route cables and position equipment safely.
- This device should be installed behind the institution firewall for network security and anti-virus protection. No ongoing computer virus protection or network security for this medical device is provided (e.g., a computer firewall). Network security and anti-virus provisions are the ongoing responsibility of the user or institution.

Connection of the device to the power supply:

**CAUTION:**
Risk of damaging the device by using the wrong power supply:

**INSTRUCTION:**
Prior to connecting the device to the mains:
- Compare the power requirements indicated on the type label with the available power supply in the installation room.
- Check the service manual for the type of input voltage selection, manual or automatic: If manual, select the appropriate voltage and fuses.
- Confirm to use the correct socket and plug for the required power supply.
- Check the equipment will work with the power supply available.
Ground potential differences:

**CAUTION:**

To comply with ISO 60601-1 (annex I) all computers and peripherals must be connected to the same power source.

**INSTRUCTION:**

- Always connect the associated monitor to the same Uninterruptible Power Source as the PC.
- When different combinations of equipment are used in various medical environments a potential difference (V) can exist between the protective earths in different localities. If the protective earthing fails this potential difference can cause a HAZARD for the OPERATOR or for the PATIENT.

### 19 Safety Directions for Maintenance and Repair Activities

- This Technical Documentation identifies the parts on which preventive inspection and maintenance shall be performed by Agfa HealthCare service personnel, including the periods to be applied.
- In general the device has to be switched off during service activities. Exception: If the device is switched on to perform tests pay particular attention to any hazards due to moving and rotating parts. Avoid loose clothing or finger traps. Switch off the device immediately after the tests.
- Do not turn motors manually. If required, first disconnect the motor from the motor control board.
- Make sure that the power cord does not show any signs of damage.
- After repair work always check that the integrated safety features are not overridden or disconnected.
- If there is any visible damage to the machine casing do not hand-over the product to the customer. First repair the machine casing.
Replacing batteries:

**WARNING:**
Battery can explode, causing chemical burns.

**INSTRUCTION:**
- Check that batteries are inserted with correct polarity.
- Only use batteries of the same type or an equivalent type as specified by the manufacturer.
- Dispose of empty batteries in compliance with the specifications of the manufacturer.
- When removing lithium batteries from the equipment take appropriate measures to avoid short circuit of the battery:
  Either use tape to cover the two poles of the battery or put the battery back in its original packing and secure the packing by tape.

Performing the electrical test according to national regulations:

**WARNING:**
Improper ground connections inside the device or too high leakage current may lead to electric shocks.
- After any work at the power supply or at any component connected to mains voltage inform the responsible organization\(^1\) about the necessity of the electrical test according to national regulations.
  If specific national regulations do not exist: It is recommended to perform the electrical test according to IEC 62353.
- Make sure, that all grounding connections to metallic covers and all grounding connections inside the device are present.

**NOTE:**

---

\(^1\) Responsible Organization:
Entity accountable for the use and maintenance of a medical equipment or a medical equipment system. The accountable entity can be, for example, a hospital or an individual clinician.

**DOCUMENT CONTROL NOTE:**
The controlled version of this document resides on MedNet. Any printed copy of this document is uncontrolled.
Performing service activities at devices emitting laser radiation:

**WARNING:**
Laser radiation. Eye injury possible.

**INSTRUCTION:**
- Strictly observe the warning notes in the service manual of devices emitting laser radiation (See service manual chapter describing Safety Guidelines / General Repair Instructions) and at the corresponding steps of instructions.
- Strictly observe the warning labels at the modules emitting laser light. For the meaning of the labels refer to section 3.3 in this document.
- Do not look into the laser beam.
- Do not open modules containing a laser. Only open modules containing a laser if explicitly instructed to do so.
- Do not keep tools in the laser beam unless explicitly instructed to do so.
- Make yourself familiar with the path of the laser light and the conditions, when the laser beam is switched on. Refer to the Functional Description in the corresponding service manual.
- Do not operate modules with laser outside the device.

Sharp edges:

**CAUTION:**
Sharp edges inside the device: Cut or abrasion possible.
Be careful at maintenance and replacement of parts.

Cleaning optical elements:

**CAUTION:**
Image artifacts possible after cleaning optical elements.
When cleaning optical elements follow the service manual precisely.
Secured screws:

**CAUTION:**

Opening screws secured by red lacquer may misalign important device adjustments:

Do not open screws that are secured by red lacquer.

Opening PCs and Workstations:

**Warning:**

Electrical shock and damage to the equipment possible.

- Only open the PC or workstation if explicitly stated in the service manual.
- Unplug before opening.
- Observe anti-static safety regulations.

Replacing fuses:

**Warning:**

Replacing fuses by wrong type may lead to fire hazard!

Use only fuses of the exact value and characteristics stated in the service manual or on the device.

20 Safety Directions for remote Service Activities

Remote Service Activities:

**Warning:**

During remote service activities images can be lost.

Inform the customer prior to remote service activities to finish the current work and to stop working on the system.
21 Safety Directions for Transport and Shipment of Spare Parts, Accessories and Devices

- In compliance with transport regulations, all uninterruptible power supplies (UPS) must be shipped with batteries disconnected.
- Use the original packing when returning spare parts, accessories or devices.
- Before returning any spare part with a built in lithium battery remove it and dispose the batteries locally according to local waste regulations.

22 Safety Directions concerning Modifications

Modifications made in products/systems shipped by Agfa HealthCare must not be implemented without written permission from Agfa HealthCare. This applies in particular to changes which may affect the mechanical and/or electrical safety or radiation-protection properties of a product (e.g. changing of safety distances, removal of locks/instructions etc.).

23 Safety Directions concerning Hazardous Materials

'Hazardous materials' is the designation for substances which can ignite or explode or which are toxic, injurious to health, corrosive or irritating. The “Hazardous Material” instructions must be read and the required protective measures must be complied with when performing work to avoid health risks. Their properties together with the hazards and protective measures connected with them are identified clearly by symbols and described by the instructions appertaining to the hazardous substances.

24 Recycling

Agfa HealthCare has Recycling Passports available for all equipment. The Recycling Passport explains whether hazardous materials, special components and batteries are present, where they are located and how they can be removed at the end of the life cycle. The Recycling Passports are meant to be used as information for waste treatment partners and companies that want to recycle end-of-life Agfa equipment.

To get a copy of the required Agfa HealthCare Recycling Passport please contact your local Sales organization.
25 Waste Disposal

On August 13, 2005, the European Directive on Waste Electrical and Electronic Equipment (WEEE) 2002/96/EC, amended by Directive 2003/108/EC, came into force. The directive on Waste Electrical and Electronic Equipment (WEEE) aims to prevent the generation of electric and electronic waste and to promote the reuse, recycling, and other forms of recovery. It therefore requires the collection of WEEE, recovery, and reuse or recycling. This directive has to be implemented into national law by the individual European countries by August 13th 2005.

Due to the implementation into national law, specific requirements can be different within the European Member States.

This symbol on the product, or in the manual and in the warranty, and/or on its packaging indicates that this product shall not be treated as household waste.

For more detailed information about take-back and recycling of this product, please contact your local Agfa service organization. By ensuring this product is disposed of correctly, you will help prevent potential negative consequences for the environment and human health, which could otherwise be caused by inappropriate waste handling of this product. The recycling of materials will help to conserve natural resources.

If your equipment or replaced spare parts contain batteries or accumulators please dispose of these separately according to local regulations.

26 Erasing Protected Health Information (PHI)

AGFA HealthCare Field Service Personnel or its authorized affiliates are responsible for the removal of Protected Health Information (PHI) patient data from devices, modules or parts that are removed from the customer’s site. This also applies to the exchange of spare parts, especially to parts that are returned to central warehouses for repair or refurbishing. Examples for parts or modules that may contain Protected Health Information (PHI) are: Computer hard disks, CD-ROMS, backup tapes, archive tapes.
► Purpose of this Document

This document contains:

- all important routines to be carried out prior to putting the machine in operation
- location and function of the controls and connectors of the machine
- all routines necessary to put an unpacked machine in operation.

► Document History

<table>
<thead>
<tr>
<th>Edition. Revision</th>
<th>Release Date</th>
<th>Changes compared to previous Version 2.0:</th>
</tr>
</thead>
</table>
| 2.1               | 06-2008      | • Improved the installation workflow for CR 85-X / CR 75.0  
|                   |              | • Added the task codes to the task overviews.  
|                   |              | • Added CR Mammo flatfield exposure and evaluation, see section 9.3. |

► Referenced Documents

<table>
<thead>
<tr>
<th>Document</th>
<th>Title</th>
</tr>
</thead>
<tbody>
<tr>
<td></td>
<td>The Service Manuals of other CR system components are listed in section 11 of this document.</td>
</tr>
</tbody>
</table>
Manufacturer
Agfa HealthCare N.V.

Publisher
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WARNING:
Improper operation or service activities may cause damage or injuries.

INSTRUCTION:
(1) Read the "Generic Safety Directions" document
(see MEDNET GSO => General Info => Agfa HealthCare => Publications
=> Service Manual) prior to attempting any operation, repair or
maintenance task on the equipment.
(2) Strictly observe all safety directions within the "Generic Safety Directions"
and on the product.

NOTE:
To verify the latest version of single documents and of Service Manuals refer to the
Document Type ‘Order List’ in the GSO library.
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NOTE:

- The Installation Checklist in the appendix of this chapter gives an overview of all steps and guides through the complete installation process.
- The time required for the installation steps within this document (target: 2 hours) should be entered in the service/installation report under the respective task code.

1 **Intended Use of the Digitizer**

This device must only be used to scan exposed X-ray cassettes, containing an erasable image plate (IP).

This device is part of a system, consisting at least of:

- Digitizer
- X-ray cassettes with erasable phosphor image plates,
- An identification station for the cassettes and
- A processing station where the resulting digital image information is further processed and routed.

It is intended that this device is only operated in a radiological environment by qualified staff.
2 Prerequisites for Installation

**Goal**
The purpose of this section is to list the required tasks before physical installation, to guarantee a smooth digitizer installation.

**TOOLS:**
- Service PC
- Serial interface cable (RS-232) for connection between digitizer and Service PC
- Cu filter (spare part number*: CM+9 5155 1015 2)
  Remark: The CU-filter is also part of the digitizer delivery.
- CD ROM with test images (spare part number*: CM+9 5145 3055 0)
- Screwdriver medium size
- Open end wrench (17 mm)
- Socket wrench (7 mm)
- Configuration file (adc.cpf) which you prepared beforehand (on a floppy disk)
- Empty floppy disk or USB-stick for storing machine specific data
- “Mammography Calibration Kit”, which is part of the digitizer delivery for exclusive Mammography sites

* The last digit in the spare part number indicates the spare part revision at release of this document. When ordering, the actual revision of the spare part is delivered.

<table>
<thead>
<tr>
<th>Task</th>
<th>Importance</th>
<th>Task Code</th>
<th>Details see section</th>
</tr>
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<tr>
<td>Checking Installation Site Prerequisites</td>
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<td>2.1</td>
</tr>
<tr>
<td>Required Service Programs</td>
<td>mandatory</td>
<td>PRI</td>
<td>2.2</td>
</tr>
<tr>
<td>Compare voltage indicated on type label with available power supply</td>
<td>mandatory</td>
<td>PRI</td>
<td>2.3</td>
</tr>
</tbody>
</table>
2.1 Checking Installation Site Prerequisites

Check that all site prerequisites shown in the Installation Planning-Checklist (can be found at the end of Chapter 11, CR 85-X Service Manual) are fulfilled before visiting the site.

2.2 Required Service Programs

2.2.1 CCM-Tool

The CCM-Tool is needed to create and modify the configuration file (adc.cpf) for the CR 85-X and the other CR system components. The latest version of the CCM-Tool is installed by default on the NX processing station (Go to Start → Agfa → Service → CCM Tools).

If not yet done create and/or adapt the configuration file adc.cpf together with the application specialist.

NOTE:
When integrating the digitizer into an existing network, it is strongly recommended to create a CPF– file beforehand (see CR 85-X Service Manual, Chapter 11, Installation Planning, checklist).

For detailed information on the configuration file, see:
ADC Application Manual - Chapter 11, DD+DIS181.03E.

2.2.2 Error Message Program

The "SHOW ERROR PROGRAM" with the "ERROR.MSG file" translates the CR 85-X error codes into clear text.

The "SHOW ERROR PROGRAM" is a part of IMOS, the "ERROR.MSG file" is loaded in the digitizer.
2.3 Compare voltage indicated on type label with available power supply

The type label is located on the rear side of the digitizer.

Compare the voltage indicated on the type label with the supplied voltage in the installation room. Refer to the note below.

![Type label image]

NOTE:
The digitizer has an “auto switching” power supply built in. This adapts itself to the input voltage. The input voltage has to be between 200/240 V (AC), 50/60 Hz.
3 Inspection and Unpacking

Goal
The purpose of this section is to make sure that the digitizer is ready to be installed.

<table>
<thead>
<tr>
<th>Task</th>
<th>Importance</th>
<th>Task Code</th>
<th>Details</th>
<th>Importance</th>
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</thead>
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<tr>
<td>Inspection of Packing</td>
<td>2 min.</td>
<td>mandatory</td>
<td>INS 3.1</td>
<td></td>
</tr>
<tr>
<td>Unpacking the Components</td>
<td>10 min.</td>
<td>mandatory</td>
<td>INS 3.2</td>
<td></td>
</tr>
<tr>
<td>Checking Shipment Completeness</td>
<td>5 min.</td>
<td>mandatory</td>
<td>INS 3.3</td>
<td></td>
</tr>
<tr>
<td>Removing Transport Locks</td>
<td>10 min.</td>
<td>mandatory</td>
<td>INS 3.4</td>
<td></td>
</tr>
</tbody>
</table>

3.1 Inspection of Packing

(1) Check the packing material for visible transport damages such as:
   - Dented edges,
   - Damage on the box,
   - Torn fixing elements (metal straps, screws).

(2) Check the attached safety indicators on the packing boxes.

   - If the machine was tilted, the arrow head in the circle of the TILTWATCH (left indicator) changes from white to red.
   - If the machine was subject to shocks, the square field in the middle of the SHOCKWATCH (right indicator) changes from white to red.
IMPORTANT:
If you notice transport damages, document them (e.g. take a photo) and contact your local Sales representative.

(3) Check the completeness of the shipment by means of the bill of material (number of pallets).

(4) Compare the labels on the boxes with the customer’s order list and the shipping papers.

3.2 Unpacking the Components

The following actions should be taken when the CR 85-X is delivered. The unpacking instructions are printed on the outside of the packing material.

(1) Remove the outer packing material.
(2) Take out the accessories or boxes and store them in a safe place.
(3) Take the digitizer off the pallet and transport it to the installation site.
(4) Dispose of the packing material according to the local directions.

NOTE:
- The individual boxes inside must not be opened by the forwarder.
- For unpacking the machine and lifting it off the pallet, an area of minimal 200 x 500 cm (78.8” x 197”) is required (see figure 3).
- If the available space at the installation site is limited, the machine can be unpacked beforehand and rolled carefully to the final destination.

![figure 3](image-url)
3.3 Checking Shipment Completeness

(1) Check shipment completeness by comparing the delivery with the packing list (part of the accessories box).

(2) In case it is not complete, inform the local sales representative. He will initiate the required steps. Additionally note the missing items(s) in the installation report.

![figure 4: Example of packing list CR 85-X](image)

3.4 Removing Transport Locks

(1) Move the digitizer to its final destination.

(2) Remove the transport locks as described in the enclosure document "Removing the Transport Locks from the Digitizer", DD-DIS286.07E, which is part of the delivery.
4 Overview of Controls, Connectors and Operation Terminal

**Goal**
The purpose of this section is to introduce the digitizer controls and connectors.

4.1 Controls and Connectors

1. Status indicator LED (see table below)

2. Mains switch

3. Keypad

4. Service-Port to connect the Service PC (RS 232 - 25-pin D connector, female D)

5. Mains cable VDE/UL

6. Network connection (Ethernet port with RJ45 socket 10/100 MBit/s)

7. Supplementary grounding cable connection
   - Label on device: Potential Equalization

<table>
<thead>
<tr>
<th>Color</th>
<th>Constant / Flashing</th>
<th>Status</th>
</tr>
</thead>
<tbody>
<tr>
<td>Green</td>
<td>Constant</td>
<td>• Ready</td>
</tr>
<tr>
<td></td>
<td>Flashing</td>
<td>• Busy (treating image plate)</td>
</tr>
<tr>
<td>Red</td>
<td>Constant</td>
<td>• Error</td>
</tr>
<tr>
<td></td>
<td>Flashing</td>
<td>• Locked or warning</td>
</tr>
<tr>
<td></td>
<td></td>
<td>• Power on/self-test in progress</td>
</tr>
<tr>
<td></td>
<td></td>
<td>• Key-operator mode</td>
</tr>
<tr>
<td></td>
<td></td>
<td>• Service mode</td>
</tr>
<tr>
<td></td>
<td></td>
<td>• Digitizer not connected to Processing Station</td>
</tr>
</tbody>
</table>

(document continues with diagrams and detailed descriptions of each connector's function)

**DOCUMENT CONTROL NOTE:**
The controlled version of this document resides on MedNet. Any printed copy of this document is uncontrolled.
### 4.2 Operation Terminal

![Figure 7](image.png)

<table>
<thead>
<tr>
<th>Key</th>
<th>Function</th>
</tr>
</thead>
<tbody>
<tr>
<td>Emergency key</td>
<td>to give an image the status ‘emergency’ when it is sent to the image processing station.</td>
</tr>
<tr>
<td>Erase key</td>
<td>to erase images without digitizing them.</td>
</tr>
<tr>
<td>Key-operator key</td>
<td>to access advanced key-operator functions.</td>
</tr>
<tr>
<td>Service key</td>
<td>to access service-level functions.</td>
</tr>
<tr>
<td>Escape key</td>
<td>to quit current functions or to exit a menu without saving modifications.</td>
</tr>
<tr>
<td>Confirm key</td>
<td>to select a menu or to accept an entry in a menu.</td>
</tr>
<tr>
<td>Up key</td>
<td>to move cursor one position up to previous entry field and to scroll upwards or to increment digits in a numeric entry field.</td>
</tr>
<tr>
<td>Down key</td>
<td>to move cursor one position down to next entry field and to scroll downwards or to decrement digits in a numeric entry field.</td>
</tr>
<tr>
<td>Left key</td>
<td>to scroll backwards through multiple choices within a field, to move entry position in a numerical field in descending order (from right digit to left digit) and to toggle between values in a field.</td>
</tr>
<tr>
<td>Right key</td>
<td>to scroll forwards through multiple choices within a field, to move entry position in a numerical field in ascending order (from left digit to right digit) and to toggle between values in a field.</td>
</tr>
</tbody>
</table>
5 Mounting the Digitizer

Goal
This section describes the installation of the base plate and how to connect the digitizer to the network.

<table>
<thead>
<tr>
<th>Task</th>
<th>Importance</th>
<th>Task Code</th>
<th>Details see section</th>
</tr>
</thead>
<tbody>
<tr>
<td>Installing the Base Plate</td>
<td>5 min.</td>
<td>mandatory</td>
<td>INS 5.1</td>
</tr>
<tr>
<td>Connecting Network and Mains Cable</td>
<td>5 min.</td>
<td>mandatory</td>
<td>INS 5.2</td>
</tr>
</tbody>
</table>

NOTE:
When putting the digitizer at its final position, mind that network and mains cable are sufficient in length.

5.1 Installing the Base Plate

NOTE:
The installation of the base plate is mandatory to guarantee a good weight distribution and keep the digitizer stable while scanning.

The base plate is kept in place by the weight of the digitizer. Additionally, a double sided adhesive tape can be used to fix the plate.

(1) Remove the plastic caps (1) and (2).
(2) Move the digitizer onto the base plate at the planned installation position. Take care that the rollers are guided by the rail! Move the digitizer gently to the stop.

(3) Turn screws by hand to their stop, on both sides of the digitizer. Then use a screwdriver and perform one more turn (A). Do not give more turns!
Put the plastic caps on the screws to protect them. (B)
(4) Open the doors of the digitizer and mount the two adjustable feet (part of the delivery) with two screws (7 mm socket wrench) as shown below.

(5) Adjust the two feet with an open end wrench (17 mm), so that they touch the floor.

5.2 Connecting Network and Mains Cable

(1) Connect the network cable to the digitizer (not yet to the network wall outlet).

(2) Two different mains cables are delivered with the digitizer:
   - USA/Japan: Nema 6-15 P
   - Europe: CEE(7)VII 250 V/16 A

   Connect the appropriate mains cable at the rear side of the digitizer, (see figure 6).

(3) Plug in the mains cable at the wall outlet.

NOTE:
The digitizer has an automatic voltage selector. Voltage is adapted automatically between 200 V and 240 V AC, as soon as the machine is switched on.

→ The Pre-installation is completed.
6 Performing Digitizer Setup

Goal
This procedure describes the steps to start up the digitizer.

NOTE:
In case of any problems during the installation, consult chapter 3.3 (Troubleshooting).

<table>
<thead>
<tr>
<th>Task</th>
<th>Importance</th>
<th>Task Code</th>
<th>Details see section</th>
</tr>
</thead>
<tbody>
<tr>
<td>Switching the Digitizer on</td>
<td>1 min.</td>
<td>INS</td>
<td>6.1</td>
</tr>
<tr>
<td>Performing Cassette Test Cycles</td>
<td>10 min.</td>
<td>INS</td>
<td>6.2</td>
</tr>
</tbody>
</table>

6.1 Switching the Digitizer on

(1) Make sure the digitizer is not connected to the network (otherwise an IP address conflict could arise).

(2) Press main switch to start the digitizer.

About 40 sec. after the digitizer has been switched on, the following screen is displayed:

The digitizer executes a self-test, initializes all its components, goes through a start-up procedure and checks for cassettes, image plates and images still to be transmitted in the image queue. During this stage, the status indicator is red and flashing. This takes 3-4 min.

(3) After a successful start-up procedure, following screen is displayed and the status indicator is constant green.

→ The digitizer is ready for processing cassettes.
6.2 Performing Cassette Test Cycles

**Goal**
This procedure checks, whether all cassette formats available at the customer site can be handled properly by the digitizer.

**NOTE:**
Perform at least one test cycle for each cassette format.

1. Open Service menu on the local key pad of the digitizer.
2. Select <2 MAINTENANCE> <3 Test and adjust cycle> <4 Handling Cycle>.

   ![Service menu screenshot](image.png)

3. Use up and down keys to enter number of handling cycle(s) and confirm with.
4. Place the cassettes in the input buffer of the digitizer.
   - The handling cycle runs until all cassettes of the input buffer have been processed.
7 Configuring Digitizer Settings

**Goal**
This section describes necessary software settings for the start-up of the digitizer.

<table>
<thead>
<tr>
<th>Task</th>
<th>Importance</th>
<th>Task Code</th>
<th>Details see section</th>
</tr>
</thead>
<tbody>
<tr>
<td>Setting Date and Time</td>
<td>3 min.</td>
<td>INS</td>
<td>7.1</td>
</tr>
<tr>
<td>Setting the Digitizer User Interface Language (default: English)</td>
<td>3 min.</td>
<td>INS</td>
<td>7.2</td>
</tr>
</tbody>
</table>

### 7.1 Setting Date and Time

1. Open Key-Operator menu on the local key pad of the digitizer.
2. Select <Date and Time>.
3. Set the date and time:
   - Use the left and right keys to select the digit you want to change.
   - Use the up and down keys to set the digit to the desired value.
4. Confirm date and time with .

→ Setting of date and time completed.
7.2 Setting the Digitizer User Interface Language

**Goal**
User interface messages are available in eleven languages. As default English is set. To change the language of the digitizer user interface perform following procedure:

1. Open Service menu on the local key pad of the digitizer.
2. Select <6 CONFIGURE>
   <2 User terminal language>.
3. Use up and down keys to select user interface language from list and confirm with .
4. Exit service menu with .
5. When the system requests to confirm the changes press .

→ Change of user interface language completed.
8 Configuring Network Settings

**Goal**
This procedure serves to integrate the digitizer into an existing network via a cpf-file.

<table>
<thead>
<tr>
<th>Task</th>
<th>Task Code</th>
<th>Importance</th>
</tr>
</thead>
<tbody>
<tr>
<td>Configure the network settings</td>
<td>10 min.</td>
<td>INS</td>
</tr>
<tr>
<td></td>
<td></td>
<td>mandatory</td>
</tr>
</tbody>
</table>

(1) Open left front door of the digitizer.
(2) Insert the storage medium with prepared configuration file (adc.cpf).
(3) Open Service menu on the local key pad of the digitizer.
(4) Select:

```
<5 INSTALL data>
<6 CPF-File>.
```

(5) Choose a name suggested on the display.
(6) Follow the online instructions.
(7) Switch off the digitizer.
(8) Connect the digitizer to the network wall outlet.
(9) Switch on the digitizer.

→ Digitizer is integrated into existing network.

**NOTE:**
For VIPS and CR QS systems:
The cpf – file has to be installed on the digitizer and on the processing station.
For NX systems:
The cpf – file has to be installed only on the digitizer.
Set Digitizer operational

Goal
This section describes the steps to set the digitizer into operation and to check the technical image quality.

<table>
<thead>
<tr>
<th>Task</th>
<th>Importance</th>
<th>Task Code</th>
<th>Details see section</th>
</tr>
</thead>
<tbody>
<tr>
<td>Checking Destinations</td>
<td>5 min.</td>
<td>mandatory</td>
<td>INS 9.1</td>
</tr>
<tr>
<td>Erasing Image Plates</td>
<td>approx. 1 min. per plate</td>
<td>mandatory</td>
<td>INS 9.2</td>
</tr>
<tr>
<td>Checking the technical Image Quality</td>
<td>20 min.</td>
<td>mandatory</td>
<td>INS 9.3</td>
</tr>
</tbody>
</table>

9.1 Checking Destinations and sending Test Image

NOTE:
The destinations, i.e. processing stations, intended for the digitizer, have to be put into operation and must be obtainable via Ethernet.

(1) Open Service menu on the local key pad of the digitizer.

(2) Select
   <8 CHECKS>
   <3 Check destinations>.

(3) Check whether the processing station(s) is/are obtainable by sending a ping to each destination.

(4) Open Key-Operator menu.

(5) Send a test image to the processing station(s) by selecting
   <8 CHECKS>
   <8 Send Testimage>.

→ Test images can be sent to Processing Station(s).
9.2  Erasing Image Plates

**NOTE:**
Before the hand over of the digitizer to the client all available image plates must be erased.

1. Press the erase key on the local keypad of the digitizer.
2. Following screen appears:

```
READY
ERASURE
WARNING
The next cassette(s) will be erased
Enter number of cassettes to erase:
Put cassette(s) in input buffer or
press X to quit
```

3. Enter number of cassettes to erase with up and down keys.
4. Place cassettes in input buffer of the digitizer.

9.3  Checking the technical Image Quality

9.3.1  Printing Test Images

The hard disk of the digitizer contains samples showing the minimal required image quality.

Send two flatfields (banding pattern and calibration pattern) to a printer via service-menu.

1. Open Service menu on the local key pad of the digitizer.
2. Select
   
   `<8 CHECKS>`
   `<6 SEND flatfield>`.

```
<table>
<thead>
<tr>
<th>1 System check</th>
<th>Service menu</th>
</tr>
</thead>
<tbody>
<tr>
<td>2 Check laser</td>
<td>CHECKS</td>
</tr>
<tr>
<td>3 Check destinations</td>
<td></td>
</tr>
<tr>
<td>4 Check disk</td>
<td></td>
</tr>
<tr>
<td>5 Check sensors</td>
<td></td>
</tr>
<tr>
<td>6 Send flatfield</td>
<td>X :cancel</td>
</tr>
<tr>
<td>7 Send test sheet</td>
<td>✓ :ok</td>
</tr>
<tr>
<td>8 Check I/O-bus</td>
<td></td>
</tr>
</tbody>
</table>
```

3. Compare the samples with the images you create in 9.3.2.
9.3.2 Exposing and evaluating a Flatfield

9.3.2.1 Exposing and evaluating a Flatfield for CR

1) Expose a flatfield and evaluate the image on the processing station and the corresponding printer.
Criteria: homogenous field, no stripes or any artifacts.

2) Have a new plate of every format exposed twice as follows:

```
<table>
<thead>
<tr>
<th>Rotating Anode</th>
<th>Cathode</th>
</tr>
</thead>
<tbody>
<tr>
<td>x-ray tube</td>
<td></td>
</tr>
</tbody>
</table>
```

(3) Place the cassette in length direction to the X-ray tube; see figure above.

→ 1st exposure: dose: 10 µGy (1,142 mR)

(4) Select the following exposure parameters to obtain a dose of 10 µGy by using a 1.5 mm Cu-filter:
- 12 mAs
- 75 kVp
- 1.3 m (51.2") distance and
- Large focus.

**NOTE:**
Please note that these are approximate values that may vary within the X-ray devices to reach the specified dose of 10 µGy.

(5) Turn cassette by 180°.

(6) 2nd exposure: use same parameters as in the 1st exposure.

Best use a dosimeter to measure the dose!
(7) Identify the cassette as follows:

- **On CR QS Processing Station:**
  
  Select **Study type:** <System Diagnosis>.
  
  Select **Substudy:** <Flat field>.
  
  Confirm **Exposure class:** <200>.

![figure 21](image1)

- **On NX Processing Station:**
  
  Select **Exam Group:** <System Diagnosis>.
  
  Select **Exposure Type:** <Flat Field>.
  
  Confirm **Detector Sensitivity:** <200>.

![figure 22](image2)

(8) Scan the cassette in the digitizer.

(9) Print the image on a printer with a window setting of 1.2 without changing the level setting on the NX processing station.

(10) Check the image quality of the flat field for absence of any stripes and large area inhomogeneities.

NOTE:

If the image quality does not reach the one of the sample printed in section 9.3.1, first consult chapter 3.6, Adjustments and calibrations of the CR 85-X Service Manual, then, in case this did not solve the problem, contact your support center.
9.3.2.2 Exposing and evaluating a Flatfield for Mammo

1. Remove the compression paddle.
2. Fix the Al-filter below the collimation window. Make sure the tape is not getting in the optical path of the X-rays.

NOTE:
In order to fix the Al-filter below the collimation window, a reliable adhesive tape is required. Depending on the adhesive tape, a solvent may be required for the cleaning of the X-ray source.

3. Select the following exposure parameters:
The dose of 350 μGy or 40 mR can be typically achieved by using a 2.0 mm Al-filter (Spare part number*: CM+9.5148.1090.0, also enclosed in the "Mammography Calibration Kit which is part of the digitizer delivery):
- 200 mAs,
- 28 kVp,
- Molybdenium source / Molybdenium filter (Mo/Mo),
- Large focus.
* The last digit in the spare part number indicates the spare part revision at release of this document. When ordering, the actual revision of the spare part is delivered.

4. Put in the cassette. Take care that the chest wall side is orientated to the front of the X-ray source.
5. Expose the cassette.

NOTE:
Perform one single exposure! Rotation of cassette is not required.

6. Remove the Al-filter.
7. Clean the X-ray source with a solvent.
(8) Identify the cassette as follows:

- On NX Processing Station:

  Select Exam Group: 
  <System Diagnosis>.

  Select Exposure Type: 
  <Flat Field>.

  Confirm Detector Sensitivity: 
  <50>.

- On CR QS Processing Station:

  Select Study type: 
  <System Diagnosis>.

  Select Substudy: 
  <Flat field>.

  Confirm Exposure class: 
  <50>.

(9) Scan the cassette in the Digitizer.

(10) Print the image on a printer with a window setting of 1.2 without changing the level setting on the NX processing station.

(11) Check the image quality of the flat field for absence of any stripes and large area inhomogenities.

NOTE:
If the image quality does not reach the one of the sample printed in section 9.3.1, first consult chapter 3.6, Adjustments and calibrations of the CR 85-X Service Manual, then, in case this did not solve the problem, contact your support center.
10 Completing the Digitizer Installation

Goal This section describes how to finish a digitizer installation.

<table>
<thead>
<tr>
<th>Task</th>
<th>Importance</th>
<th>Task Code</th>
<th>Details see section</th>
</tr>
</thead>
<tbody>
<tr>
<td>Confirming the Installation</td>
<td>1 min.</td>
<td>INS</td>
<td>10.1</td>
</tr>
<tr>
<td>Backup of Machine specific Data</td>
<td>10 min.</td>
<td>INS</td>
<td>0</td>
</tr>
<tr>
<td>Performing Last Steps</td>
<td>5 min.</td>
<td>INS</td>
<td>10.3</td>
</tr>
</tbody>
</table>

10.1 Confirming the Installation

1. Open Service menu on the local key pad of the digitizer.

2. Select "<2 MAINTENANCE> <8 Confirm installation>"

3. When being asked to confirm the installation, press ✓.

→ Confirmation of installation completed.
10.2 Backup of Machine specific Data

(1) Open left front door of the digitizer and insert floppy disk or plug in storage medium.

(2) Open Service menu on the local key pad of the digitizer.

(3) Select
   <3 Save data>
   <2 Machine specific data>.

(4) When asked to enter a storage medium confirm with.

(5) When using a floppy disk label it as follows:

S/N: <XXX>
Date: <date>
Software-ACP_xxxx
version:

→ Backup of machine specific data completed.

10.3 Performing Last Steps

(1) Dispose of all packing material (depending on the country, by the forwarding agent or by the hospital).

(2) Fill out the installation report delivered with the device and send it by to the regional service manager.

(3) Hand over the CR System to the application specialist.
# 11 Referenced Documents for Connectivity of CR Devices

**NOTE:**
For detailed information on the installation of CR devices refer to the respective documentation on MedNet GSO Library:

<table>
<thead>
<tr>
<th>Device</th>
<th>Document Number</th>
<th>Chapter</th>
</tr>
</thead>
<tbody>
<tr>
<td>NX 1.0, Service Manual</td>
<td>DD+DIS408.05E</td>
<td>Chapter 5</td>
</tr>
<tr>
<td>NX 2.0, Service Manual</td>
<td>DD+DIS259.06E</td>
<td>Chapter 5</td>
</tr>
<tr>
<td>CR QS 3.5, Service Manual</td>
<td>DD+DIS302.05E</td>
<td>Chapter 1</td>
</tr>
<tr>
<td>CR QS 3.0, Service Manual</td>
<td>DD+DIS273.04E</td>
<td>Chapter 1</td>
</tr>
<tr>
<td>ADC QS 2.1, Service Manual</td>
<td>DD+DIS135.02E</td>
<td>Chapter 1</td>
</tr>
<tr>
<td>CR User Station (CRUS), Service Manual</td>
<td>DD+DIS025.05E</td>
<td>Chapter 3</td>
</tr>
<tr>
<td>Drystar 4500, Service Manual</td>
<td>DD+DIS005.03E</td>
<td>Chapter 1</td>
</tr>
<tr>
<td>Drystar 5300, Service Manual</td>
<td>DD+DIS008.04E</td>
<td>Chapter 1</td>
</tr>
<tr>
<td>Drystar 5302, Service Manual</td>
<td>DD+DIS150.05E</td>
<td>Chapter 1</td>
</tr>
<tr>
<td>Drystar 5500/5503, Service Manual</td>
<td>DD+DIS093.03E</td>
<td>Chapter 1</td>
</tr>
<tr>
<td>Drystar Axys Service Manual</td>
<td>DD+DIS033.07E</td>
<td>Chapter 1</td>
</tr>
</tbody>
</table>
| CR Mammography Solution, Service Manual     | DD+DIS227.04E    | Chapter 3.3  
|                                             |                  | Chapter 3.4  |
| ADC Application Manual                      | DD+DIS181.03E    | Chapter 11;  
|                                             |                  | section CCM Tool 1.1.07  |
# 12 Installation Checklist

<table>
<thead>
<tr>
<th>No.</th>
<th>Step</th>
<th>See section</th>
<th>OK</th>
</tr>
</thead>
<tbody>
<tr>
<td></td>
<td><strong>Prerequisites for Installation</strong> (Task Code: PRI)</td>
<td></td>
<td></td>
</tr>
<tr>
<td>1.</td>
<td>Checking installation site prerequisites.</td>
<td>2.1</td>
<td>X</td>
</tr>
<tr>
<td>2.</td>
<td>Checking and adapting the configuration file.</td>
<td>2.2</td>
<td>X</td>
</tr>
<tr>
<td>3.</td>
<td>Compare voltage indicated on type label with available power supply.</td>
<td>2.3</td>
<td>X</td>
</tr>
<tr>
<td></td>
<td><strong>Inspection and Unpacking</strong> (Task Code: INS)</td>
<td></td>
<td></td>
</tr>
<tr>
<td>4.</td>
<td>Inspection of Packing.</td>
<td>2 min.</td>
<td>X</td>
</tr>
<tr>
<td>5.</td>
<td>Unpacking the components.</td>
<td>10 min.</td>
<td>X</td>
</tr>
<tr>
<td>6.</td>
<td>Checking shipment completeness.</td>
<td>5 min.</td>
<td>X</td>
</tr>
<tr>
<td>7.</td>
<td>Removing transport locks.</td>
<td>10 min.</td>
<td>X</td>
</tr>
<tr>
<td></td>
<td><strong>Mounting the Digitizer</strong> (Task Code: INS)</td>
<td></td>
<td></td>
</tr>
<tr>
<td>8.</td>
<td>Install base plate.</td>
<td>5 min.</td>
<td>X</td>
</tr>
<tr>
<td>9.</td>
<td>Connect network and mains cables.</td>
<td>5 min.</td>
<td>X</td>
</tr>
<tr>
<td></td>
<td><strong>Perform digitizer Setup</strong> (Task Code: INS)</td>
<td></td>
<td></td>
</tr>
<tr>
<td>10.</td>
<td>Switch the digitizer on.</td>
<td>1 min</td>
<td>X</td>
</tr>
<tr>
<td>11.</td>
<td>Perform cassette test cycles.</td>
<td>10 min.</td>
<td>X</td>
</tr>
<tr>
<td></td>
<td><strong>Configuring Digitizer Settings</strong> (Task Code: INS)</td>
<td></td>
<td></td>
</tr>
<tr>
<td>12.</td>
<td>Set date and time.</td>
<td>3 min.</td>
<td>X</td>
</tr>
<tr>
<td>13.</td>
<td>Set digitizer user interface language.</td>
<td>3 min.</td>
<td>X</td>
</tr>
<tr>
<td></td>
<td><strong>Configuring Network Settings</strong> (Task Code: INS)</td>
<td></td>
<td></td>
</tr>
<tr>
<td>14.</td>
<td>Configure the network.</td>
<td>10 min.</td>
<td>X</td>
</tr>
<tr>
<td></td>
<td><strong>Set Digitizer operational</strong> (Task Code: INS)</td>
<td></td>
<td></td>
</tr>
<tr>
<td>15.</td>
<td>Check destination(s) and send test image(s).</td>
<td>5 min.</td>
<td>X</td>
</tr>
<tr>
<td>16.</td>
<td>Erase all image plates.</td>
<td>1 min./plate</td>
<td>X</td>
</tr>
<tr>
<td>17.</td>
<td>Check the technical image quality.</td>
<td>20 min.</td>
<td>X</td>
</tr>
<tr>
<td></td>
<td><strong>Completing the Digitizer Installation</strong> (Task Code: INS)</td>
<td></td>
<td></td>
</tr>
<tr>
<td>18.</td>
<td>Confirm the installation.</td>
<td>1 min.</td>
<td>X</td>
</tr>
<tr>
<td>19.</td>
<td>Make a backup of machine specific data.</td>
<td>10 min.</td>
<td>X</td>
</tr>
<tr>
<td>20.</td>
<td>Perform last steps.</td>
<td>5 min.</td>
<td>X</td>
</tr>
</tbody>
</table>
Purpose of this document

This document explains the functional principle including the functions of the individual assemblies always under normal conditions without any problems (nominal functional sequence).

Furthermore it describes the structure and function of specific individual assemblies.

Document History

<table>
<thead>
<tr>
<th>Edition</th>
<th>Release Date</th>
<th>Changes compared to previous version 2.0</th>
</tr>
</thead>
<tbody>
<tr>
<td>2.1</td>
<td>10-2008</td>
<td>- Section 1 updated with NX Workstation information.</td>
</tr>
<tr>
<td></td>
<td></td>
<td>- Section 3.5 added: Revised CR Mammography Cassettes.</td>
</tr>
<tr>
<td></td>
<td></td>
<td>- Section 4.5.2 added: Overview of new cPCI-Rack with Revive Board.</td>
</tr>
</tbody>
</table>

Referenced Documents

<table>
<thead>
<tr>
<th>Document</th>
<th>Title</th>
</tr>
</thead>
<tbody>
<tr>
<td>n.a.</td>
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**WARNING:**
Improper operation or service activities may cause damage or injuries.

**INSTRUCTION:**
(1) Read the "Generic Safety Directions" document
(see MEDNET GSO => General Info => Agfa HealthCare => Publications => Service Manual) prior to attempting any operation, repair or maintenance task on the equipment.

(2) Strictly observe all safety directions within the "Generic Safety Directions" and on the product.

**NOTE:**
To verify the latest version of single documents and of Service Manuals refer to the Document Type 'Order List' in the GSO library.
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1 Digitizer as a Part of the CR System

1.1 CR System Components

1.1.1 ADC Cassette with image plate inside

The ADC cassette is the “container” for the image plate. During the handling outside the Digitizer (e.g. exposing the plate) the image plate is in the cassette. It is only opened inside the Digitizer.

The ADC cassette has an internal chip card which holds the cassette, patient, examination and routing data belonging to a certain X-ray exposure. The data put together are called demographic data.

The image plate takes the place of the X-ray film in a conventional system. It receives the X-Ray radiation and “stores” a latent image. The image plates can be reused thousands of times. The actual restriction of utilization is the mechanical robustness.

1.1.2 Identification Tablet – CRUS (CR User Station)

The Identification Tablet is used to write the cassette, patient, examination and routing data to the cassette chip. This data can be entered manually or by retrieving the data from a Hospital or Radiology Information System (HIS/RIS).

Writing and reading is done by means of radio frequency in a contact less manner.

The Identification software is an AGFA product and implemented in the ADC QS software.
1.1.3 Digitizers (CR 85-X / CR 75.0 / ADC Compact Plus / CR 35-X / CR 25.0 / ADC Solo)

The Digitizer reads the latent image in the image plate. After the ADC cassette is exposed and identified it is inserted into the Digitizer. The Digitizer reads the data on the cassette chip, opens the cassette, takes out the image plate and scans it.

The latent image on the image plate is stimulated by means of a laser beam to emit light according to X-ray exposure.

The data from the cassette chip is used to set the scan parameters correctly (e.g. speed class, image plate size, etc.) for this individual X-ray exposure.

The emitted light is converted into voltage and then digitalized into a 12/14bit, square root compressed raw image. This image is transmitted together with the chip data on the fly via Ethernet to the Processing Station. A backup of that image is made on the internal hard disk in parallel to retransmit the image in case of transmission problems. The output format of the Digitizer is DICOM SCU-CR.

After scanning / transmitting is finished the image plate is erased with very bright light to make it ready for the next exposure. It is put back into the cassette and a status flag on the cassette chip is set from "EXPOSED" to "ERASED". The cassette is returned to the user and is ready for the next examination.
1.1.4  CR Workstations

QS Server Station
The ADC QS 2.0.x/2.1.x (Quality System) Server Station is a Windows NT4.0 based Workstation with the ADC Quality-System software installed.

The CR QS 3.x (Quality System) Server Station is a Win2000Server or Win XP-based Workstation with the CR Quality-System software installed.

The Server Station receives the raw image from the Digitizer. Every incoming image runs through an image processing. The processed images are stored on the internal hard disk(s) of the Server station. The Server station only provides short term storage. The final archiving must be realized either by hardcopies or a PACS.

The Server station decodes the routing data and sends the image data to the selected destinations (e.g. Printer, PACS).

A Softcopy can be sent to an Archive with 8 or 12 bit. To print a Hardcopy a 8 bit format is used.

For the Server station a lot of licensed software options (e.g. Annotation, Print Composer, etc.) exist.

QS Client Station or NX Workstation
The Client Station and the NX Workstation allows identification and basic viewing of the images.
1.2 Work Flow of the CR System

figure 1
2 \hspace{1em} \textbf{Image Plates}

The CR plate can be identified by the plate type and sensitivity code printed on the back.

2.1 \hspace{1em} \textbf{ADC MD30 Image Plate Principle}

The image plate lying in the cassette consists of five different layers:

Legend figure 2:

1. Protective EBC (electron-beam-cured) top coat
2. Phosphor layer
3. Anti-halo layer, blue
4. Support P.E.T, white
5. Laminate

The phosphor layer is “storing” the picture information as energy.

The EBC top coat provides a smooth surface of the image plate to reach a good signal-to-noise ratio.

Combination of white support layer and blue anti-halo layer increases the sensitivity.

The anti-halo layer lets through the stimulated light but blocks laser light.

The laminate is needed as base material.
2.2 CR MD40 General Plate

CR MD40 Plates are initialized with code 15.

The fourth-generation imaging plate is composed of the following six layers:

- **Improved phosphor layer**: The storage phosphors used in the phosphor layer provide high absorption efficiency and excellent homogeneity, while their short response time ensures the fading of the previous pixel before stimulating the next one. A high level of sharpness at all spatial frequencies is thus secured.

- **Additional adhesion layer**: Another new feature of the ADC MD40 imaging plate is the introduction of an additional adhesion layer. This gives the ADC MD40 imaging plate better mechanical stability than its forerunners, and prevents peeling at the corners.

- **Electron-Beam-Cured (EBC) top-coating technology**: Agfa's long experience and extensive research into plate abrasion resistance has led to a dramatic improvement in EBC top-coating technology. This improved technology has been used for the ADC MD30 as well as for the ADC MD40.
White support layer and anti-halo layer

The use of a white support layer in combination with an anti-halo layer gives high sensitivity. The anti-halo layer is an Agfa-patented blue layer that forms a perfect barrier against laser light, but lets through the stimulated light.

Downward compatibility

Each ADC MD40 imaging plate is identified by a code on the back. The ADC MD40, ADC MD30 and ADC MD10 plates can be used together without any problem.

2.3 CR MM3.0 Image Plate – Special Treatments

CAUTION:
Wrong screen cleaner may damage the Image plate.

Do not use the AGFA CR phosphor plate cleaner to clean the CR MM3.0 Mammo image plates. Use PROSAT wipers instead.

Use PROSAT® wipers to clean the Image Plates, order number*: ETRTM or 10+9 9999 1219 0

* The last digit in the order number indicates the spare part revision at release of this document. When ordering, the actual revision of the spare part is delivered.

- CR MM3.0 Mammo image plates require dedicated wipers.
- These wipers can only be used once, but different CR MM3.0 Mammo image plates can be cleaned one after the other with one wiper.
- Storage of the PROSAT wipers: carefully close the bag of wipers and keep in a cool place (< 25 °C).
- When cleaning CR MM3.0 Mammo image plates, leave the plate surface to dry for about one (1) minute before putting the plate back into the cassette.
3 Cassettes

The principle function of the digitizer is closely connected to the structure of the CR Cassettes. The digitizer accepts only CR Cassettes. All other cassettes, e.g. ADC 70, are refused.

NOTE:
For system preparation please refer to chapter 3.6 of this manual.

3.1 CR MD4.0 General Cassette

NOTE:
The cassette must always be inserted into the digitizer in the correct orientation to make it possible to identify and handle the cassette!

Legend figure 4:
1 ADC label
2 ID-Chip carries demographic data
3 Label showing size of Image Plate
4 Sliders to prevent from usage in film handling devices
5 Metal label – silver dot – identifies an ADC Cassette
6 ADC Image Plate (gray surface up, white surface down)

The ADC label and the label, showing the size of the contained image plate, are put on for the identification by the user.

The metal label is detected by the digitizer to identify the cassette as an ADC cassette.

The demographic data is at the ID-Station transferred by no-touch radio frequency tagging to the ID-Chip and is read out in the digitizer. The data is in that way always linked to the image.

For protection against electrostatic charging and mechanical damage the inner lining of the cassette is made of felt.
3.2 CR MD 4.1 FLFS (Full Leg Full Spine) Cassette

Specification

To improve the image quality with Full Leg Full Spine (FLFS) images a FLFS CR Cassette was introduced.

Identification

The FLFS CR Cassettes are with exception of two major differences identical to the current standard ADC Cassette (35 cm x 43 cm).

The differences are:

- Reduced backscatter protection (minus 1.5 cm at locking and hinge side)
- Specific FLFS labeling

Further points of identification

- All labels are yellow, which is unique for FLFS.
- Labeling “FLFS” to identify cassette as type FLFS#
- Yellow dots to recognize cassette as FLFS also in buffer or stack

Format

The FLFS Cassette is available in format 35 cm x 43 cm.
3.3 **Asymmetric Cassette**

**Specification**

The Asymmetric Cassette is dedicated for X-ray exposures where no centered positioning of the part of the body is possible (e.g. side view of a spinal column).

**Identification**

A cassette for asymmetric scanning can be identified by a red hatching covering less than the half of the cassette side (see beside).

![figure 6](image)

**Formats**

The ADC Asymmetric Cassette is available in:

- 21 cm x 43 cm (asymmetric partial scan of dedicated 35 cm x 43 cm cassettes)

3.4 **CR Mammography Cassette**

**Specification**

The CR Mammo Cassette is a dedicated cassette for use in combination with CR Mammo Plates 2.0 and 3.0 (CR MM 2.0 and CR MM 3.0) for dedicated mammography applications. It features a narrow hinge to allow scanning right up to the chest wall.

A distinctive feature of the CR Mammo Cassette, in comparison with general ADC cassettes, is the narrower hinge. This means that there is a closer contact with the skinline, offering an increased amount of information during scanning.

The CR Mammo Cassette contains a CR Mammo image plate. This type of image plate has a special phosphor layer which results in reduced noise and increased sharpness. The cassette is equipped with a positioning mechanism in order to ensure the chest wall distance to the image plate.
Identification

The cassette is labeled with “Mammo” on both sides.
The cassette is pre-initialized as a Mammo Cassette, but if the identification is lost, it can be given via the ID Station.

![Diagram of CR Mammo Cassette](image)

1. Positioning mechanism for IP (2 x, left and right cassette side)
2. Passive suction cup, keeping the IP in place inside the cassette

Formats:
The CR Mammo Cassette is available in two formats:
- 18 cm x 24 cm
- 24 cm x 30 cm
3.5 Revised CR Mammography Cassette

**Specification**

The CR Mammography cassettes and Image Plates were revised to improve functionality. For more information refer to DD+DIS233.08E (Service Bulletin No. 37).

(Intranet link / Extranet link)

**Identification**

The cassette is labeled with “Mammo” on both sides. The cassette is pre-initialized as a Mammo Cassette. If the cassette is not identified proceed as described in chapter 3.4 of the CR Mammo Solution Manual.

---

**figure 8**

1. Positioning pins, keeping the IP in place inside the cassette
2. Positioning mechanism for IP
3. Notch for positioning pins
4. Uniform fleece layer without notches in the diagnostic area

**Formats:**

The revised CR Mammo Cassette is available in two formats:

- 18 cm x 24 cm
- 24 cm x 30 cm
3.6 CR MD4.2 Extremities Cassette

Specification

The CR MD4.2 Extremities system is foreseen for X-ray images of the distal extremities and adjacent joints (hands and feet) and provides a spatial scan resolution of 50 µm.

Initialization:

- Scan size: 18 x 24 or 24 x 30 cm
- Scan resolution: Very high resolution

The CR MD4.2 Extremities cassettes can only work when digitizer software ACP_4005 or higher is installed on the CR 85-X.

Identification

CR MD4.2 Extremities cassettes can be recognized by the code label: “Extremities - code XX”

The light green dots are dedicated only to the CR MD4.2 Extremities cassette. This makes it easy to distinguish the cassette from others when stored in a rack.

![Figure 9: Labeling of the CR MD4.2 Extremities cassette](image)

Formats

New CR MD4.2 Extremities cassettes (available formats 18 x 24 cm and 24 x 30 cm) are delivered with the appropriate initialization:

- Scan size: 18 x 24 or 24 x 30 cm
- Scan resolution: Very high resolution
4 Modular Structure of the Digitizer

4.1 Overview of Modules

![Diagram of the modular structure of the digitizer with labels for each module: Input Buffer, Power Unit, Output Buffer, cPCI-Rack, Cassette Unit 1 / 2, IP Transport Unit Prescan, Rotation Unit, Optic Module, Erasure Unit, and IP Transport Unit Postscan.]

Figure 10
4.2 Input Buffer

The Input Buffer has a capacity of 10 cassettes which can be queued in front of the feed gate. The first cassette is detected and the machine cycle starts. To transport the cassette inside the digitizer the transport belt (1) shifts the cassette, the feed gate opens and the RF-tag reader reads out the ID- and image specific data.

After the data is read out, the transport roller of the cassette module takes over the movement of the cassette.
4.3 Power Unit

![Diagram of Power Unit with labels]

1. Main switch with over current protection
2. LEDs of Multi Supply Board
3. Interlock switch
4. Transformers
5. Filter of power unit fan

The power supply of the Power Unit is a single phase System, means the cable connection is a common inlet connector for non-heating apparatus.

The supply voltage for the Power Unit is automatically detected in the range of 200 – 240 V (AC), 50/60Hz. Therefore for installation it is not necessary to change any setting manually, but has to be checked before the first use.

If the interlock switch is active, all the power supplies of mechanical parts and the laser are interrupted, for safety during service interventions. The power supply of the cPCI-Rack is placed in the rack itself, so e.g. software updates can be done although the right door of the power unit is open and the interlock switch is active.
The Power Unit consists of the following main components:

- Multi Supply Board
- Erasure Control Board
- Current Sense Board
- Stepper Motor Transformers
- Erasure Transformer

### 4.3.1 Multi Supply Board

The Multi Supply Board (MS-Board) controls the mechanical periphery of the digitizer and protects the stepper motor cards. The supply voltage is detected by the board and errors are displayed by LEDs.

The following components are controlled by the IO-Bus of the board:

- The two vacuum pumps with two magnetic valves on the IP transport units, the parking position function by using solenoids at the IP transport unit postscan, the fan of the erasure unit and of the power unit and the voltage selection between 200 V, 208 V and 230/240 V.

LEDs on the inner side of right door at the power unit show the status of the supply voltages of the power unit:

- **D 42 green LED on:** Supply voltage is 230/240 V
- **D 42 yellow LED on:** Supply voltage is 208 V
- **D 42 red LED on:** Supply voltage is 200 V
- **D 14 red LED on:** Fuses of stepper motor boards Si 1 – Si 12 are okay
- **D 14 yellow LED on:** +24 V from simple switcher
- **D 14 green LED on:** +5 V from IO-Bus
Additional LEDs are visible if right door and power unit housing is open:

D19 – D32 red LEDs are corresponding to stepper motor fuses where they are placed next to. The stepper motor supply is protected with a fuse on every stepper motor board itself (12 in total). The status is shown with a green LED on the side of the power unit (see figure 12).

D 33 green LED is corresponding to the fuse (Si13) of power supply of simple switcher, which is placed next to the fuse.

Normal status:

The status of the LEDs, after switching on the digitizer with active interlock switch and without any error, is:

- D19 to D33 LED on immediately,
- D14 yellow LED on immediately,
- D14 red LED on immediately,
- D14 green LED on six seconds after switch on.
- D42 green LED on immediately, but after initialization of the supply voltage of the digitizer one of the three D42 LEDs is on, but always only one.

Example:

Status of the LEDs after initialization of the supply voltage of 208 V and more than six seconds after switch on.
4.3.2 Erasure Control Board

The Erasure-Control-Board controls five transformers to supply the erasure lamps with power. The lamps are controlled in pairs, so one transformer supplies two lamps. Also the temperature of the erasure unit is controlled, if the detected temperature is lower than 85 °C (185 °F), the erasure process can start. If the temperature is higher than 85 °C (185 °F), the process is delayed until temperature has dropped below 75 °C (167 °F). During the delay the erasure unit fan cools the module.

The failure of a lamp is detected by the current sense board, which is also part of the power unit and is connected to the Erasure-Control-Board.

4.4 Output Buffer

![Figure 15](image.png)

The Output Buffer has a capacity of 10 cassettes. The transport rollers at the gate move the cassette outside. To avoid blocking a lever (1) pushes the cassette aside which rests in the buffer.

The cassettes which are released are monitored. After the last one the machine cycle stops.
4.5 cPCI-Rack

4.5.1 cPCI-Rack (CR 75.0 Type 5146/105 up to SN 6499, CR 85-X Type 5148/100 up to SN 3999)

The cPCI-Rack (compact Peripheral Component Interconnect) consists of the processing unit CPU, the Scan Master Board, the Power Supply of the cPCI-Rack, a floppy drive and a hard disk. On top of the rack the fan for cooling the cPCI-Rack is mounted and on the back the backplane with all the connectors is placed.

figure 16

1. cPCI Rack Fan
2. cPCI Power Supply
3. CPU Oberon
4. Scan Master Board
5. Backplane
6. SCSI Hard disk (Small Computer Interface)
7. Floppy drive
4.5.1.1 CPU-board (OBERON)

The CPU (Central Processing Unit) called OBERON board is based on a Power PC and is working with an operating system called Portex. The interfaces to the service and the Ethernet are placed on the front plane.

Service:
Connector (female) to Service Interface (RS232)

Fast Ethernet Controller:
RJ45 connector, Fast Ethernet with 10 to 100 Mbit/s
Software controllable with Portex tool
Hardware related signaling:
Ethernet linked – green LED
Ethernet Traffic – yellow LED
FPGA not configured – red LED

HALT Switch: Abort action
RESET Switch: Global reset
4.5.1.2 Scan Master Board

The Scan Master Board controls the main functions of the digitizer which are related to the image data acquisition. The board has to support two operating levels, low resolution and high resolution. Therefore timing, frequency and converters need to be controlled.

**Photomultiplier Tube Control:**
Controls the Photomultiplier itself, the high voltage settings and receives the current/voltage (I/V) converter signal.

**Polygon Control:**
Controls via the Polygon the deflection of the laser beam on the image plate, controls the rotational speed and detects the facets.

**RF-Tag Reader Control:**
Controls the transmitter and receiver signals for reading out demographic data of the ADC Cassette.

**User terminal Control:**
Controls the user terminal via a 20 mA interface.

**IO-BUS Control:**
Provides the IO-BUS with power and is connected via eight data lines and three control lines to the IO-BUS.

**Laser diode Module Control:**
Controls the power supply of the laser diode of the laser module, controls the power switch of the laser diode, controls Begin-of-Line Signal and Laser-Power-Monitor board.
4.5.2 cPCI Rack
(CR 75.0 Type 5146/105 as of SN 6500, CR 85-X Type 5148/100 as of SN 4000)

The cPCI-Rack (compact Peripheral Component Interconnect) consists of the processing unit Revive Board with the hard disk and the Power Supply of the cPCI-Rack. On top of the rack the fan for cooling the cPCI-Rack is mounted.

NOTE:
The new cPCI Rack does not contain a floppy drive.
4.5.2.1 Revive Board

The Revive board controls the main functions of the digitizer. The board has to support two operating levels, low resolution and high resolution. Therefore timing, frequency and converters need to be controlled.

**Photomultiplier Tube Control:**
Controls the Photomultiplier itself, the high voltage settings and receives the current/voltage (I/V) converter signal.

**Fast Ethernet Controller:**
RJ45 connector, Fast Ethernet with 10 to 100 Mbit/s.

**RF-Tag Reader Control:**
Controls the transmitter and receiver signals for reading out demographic data of the ADC Cassette.

**Service:**
Service communication port

**Polygon Control:**
Controls via the Polygon the deflection of the laser beam on the image plate, controls the rotational speed and detects the facets.

**USB-Port:**
Standard USB Port for USB Memory Sticks Type A (Standard)

**User terminal Control:**
Controls the user terminal via a 20 mA interface.

**IO-BUS Control:**
Provides the IO-BUS with power and is connected via eight data lines and three control lines to the IO-BUS.

**Laser diode Module Control:**
Controls the power supply of the laser diode of the laser module, controls the power switch of the laser diode, controls Begin-of-Line Signal and Laser-Power-Monitor board.
4.5.3 cPCI Power Supply

During normal operation the LEDs monitor 5.1 V and 3.3 V voltage levels.

The power supply of the cPCI Rack is not interrupted by the interlock switch. This independent supply makes it possible to update software or work out other actions at the rack while both doors of the digitizer are open.
4.6 Hard disk

The gray rectangle in the partition map marks the directories which are only necessary for remote control via http access.

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<th>Directories and subdirectories</th>
<th>Files</th>
<th>Annotations</th>
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<td>CGI-BIN</td>
<td>*.BAT</td>
<td>batch and system files</td>
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<td>*.SYS</td>
<td>program files</td>
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<tr>
<td>D:</td>
<td></td>
<td>*.PRG</td>
<td>configuration files</td>
</tr>
<tr>
<td></td>
<td>PUBLIC</td>
<td>*.html</td>
<td>infocounter (binary form)</td>
</tr>
<tr>
<td></td>
<td></td>
<td>*.ZIP</td>
<td>infocounter (text form)</td>
</tr>
<tr>
<td></td>
<td></td>
<td>*.SHD</td>
<td>tables</td>
</tr>
<tr>
<td></td>
<td></td>
<td>*.SWP</td>
<td>sweep curve</td>
</tr>
<tr>
<td></td>
<td></td>
<td>*.TEMP</td>
<td>temporary files</td>
</tr>
<tr>
<td></td>
<td>FLATFLD2</td>
<td>*.ESX</td>
<td>temporary directory</td>
</tr>
<tr>
<td></td>
<td>TESTIMG</td>
<td>*.TBL</td>
<td>flatfield for calibration (lowest accepted quality)</td>
</tr>
<tr>
<td></td>
<td>TSHHEET</td>
<td>*.SHD</td>
<td>flatfield for banding (lowest accepted quality)</td>
</tr>
<tr>
<td></td>
<td>FLD00001</td>
<td>*.GIF</td>
<td>test image (Collection of diagnostic images)</td>
</tr>
<tr>
<td></td>
<td>FLD00002</td>
<td>*.JPG</td>
<td>testsheet of the optimum image quality</td>
</tr>
<tr>
<td></td>
<td>FLD00010</td>
<td>CONTROL.DAT</td>
<td>image control file + demographic data</td>
</tr>
<tr>
<td></td>
<td>LOG</td>
<td>IMAGE.DAT</td>
<td>image data</td>
</tr>
<tr>
<td></td>
<td>SCCTEMP</td>
<td>STATUS</td>
<td>only when emergency mode is activated change of status</td>
</tr>
<tr>
<td></td>
<td></td>
<td>TAGFILE</td>
<td>image control file + demographic data</td>
</tr>
</tbody>
</table>

| E:          | FLATFLD2                      | CONTROL.DAT | image control file + demographic data |
|            | TESTIMG                       | IMAGE.DAT | image data |
|            | TSHHEET                       | STATUS | only when emergency mode is activated change of status |
|            | FLD00001                      | TAGFILE | image control file + demographic data |
|            | FLD00002                      | IMAGE.DAT | image data |
|            | FLD00010                      | STATUS | only when emergency mode is activated change of status |
|            | LOG                           | IMG.DAT | image data |

---

DOCUMENT CONTROL NOTE:
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4.7 Cassette Unit 1 / 2

The Cassette Unit 1 or 2, depends on which one is at the input buffer, fixes and holds the cassette during the IP is taken out and scanned. An opener mechanism for the cassette is also part of each unit. The Cassette Units 1 and 2 together are supported and turned by the rotation unit.

On the inner side of each of the Cassette Units is a 5fold stepper motor board placed, which controls the motors of the corresponding unit.

<table>
<thead>
<tr>
<th></th>
<th>Description</th>
</tr>
</thead>
<tbody>
<tr>
<td>1</td>
<td>5fold stepper motor boards (inside)</td>
</tr>
<tr>
<td>2</td>
<td>Cassette Module 2</td>
</tr>
<tr>
<td>3</td>
<td>Cassette Module 1</td>
</tr>
<tr>
<td>4</td>
<td>Opener mechanism</td>
</tr>
<tr>
<td>5</td>
<td>Transport roller</td>
</tr>
<tr>
<td>6</td>
<td>Transport belt</td>
</tr>
</tbody>
</table>

The Cassette Unit 1 or 2, depends on which one is at the input buffer, fixes and holds the cassette during the IP is taken out and scanned. An opener mechanism for the cassette is also part of each unit. The Cassette Units 1 and 2 together are supported and turned by the rotation unit.

On the inner side of each of the Cassette Units is a 5fold stepper motor board placed, which controls the motors of the corresponding unit.
4.8 IP Transport Unit Prescan

figure 24

1 Vacuum unit
2 Suction arms
3 Guide plate

The IP transport robot takes the IP out of the cassette and leads it along the guide plate to the optic module. The transport robot is guided in the frame of the unit.
4.9 Rotation Unit

![Diagram of Rotation Unit with labels 1 and 2]

<table>
<thead>
<tr>
<th>Label</th>
<th>Description</th>
</tr>
</thead>
<tbody>
<tr>
<td>1</td>
<td>Rotational drive</td>
</tr>
<tr>
<td>2</td>
<td>Stepper motor board</td>
</tr>
</tbody>
</table>

The rotation unit rotates the Cassette Units by 180° to bring the empty cassette from the input side to the output side, for putting back the scanned and erased image plate inside the cassette.
4.10 Scan Unit

![Diagram of scan unit with labels: 1. Photomultiplier tube with acrylic light collection module, 2. Optic module with Laser, Polygon, 3. Slow scan motor, 4. 5fold stepper motor scan unit.]

The function of the scan module is to stimulate a two dimensional, X-ray exposed phosphor image plate with laser energy. Out of the blue light, which is emitted by the phosphor, a digital image is generated.

The stimulation of the image plate is done pixel by pixel. Therefore the laser beam is moved. The laser power on the focal plane is 50 mW ± 5 %. The movement in the x-axis is achieved by a rotating polygon mirror (fast scan direction) which is part of the optical path. The movement in the y-axis is done mechanically by transporting the image plate (slow scan direction) with two pairs of rolls.

The Scan mode 2 µs is used for 35 cm x 43 cm high resolution scanning.

A 1 µs scan mode has been established already in ADC Compact Plus for 35 x 43 cm cassettes standard resolution.

This principle has been enhanced in CR85-X to small formats < 35 x 43 cm. Consequently, the throughput increases because of reduced scan time. The 1 µs scan mode option can be switched on in the key operator menu.
4.10.1 Optic Module

Optic Module Housing
The housing is made of cast aluminum which is electrical isolated to the ground plate. The cover is made of conductive material to achieve electromagnetic compatibility (EMC). The housing of the optic module stays closed in the field and no service needs to be done inside.

Laser Diodes
The optic module contains a monochromatic anamorph scan optic where the laser beam is modified. The light source which is stimulating the image plate is a red laser diode, with a wavelength from 650 nm to 670 nm and a maximal output of 80 mW (see 1 in figure below), which results in 50 mW laser power on the surface of the image plate. The increase and decrease time of the laser power is shorter than 20 μs. The beam of the laser diode has a spot diameter of 60 μm on the scan surface.

![Diagram](5148_chap2_002.cdr)

1 Laser beam
2 Mirror for deflecting a small part of the laser energy to 3
3 Sensor for power sense and regulation of the laser energy
4 Polygon

Polygon
The Polygon (see 4 in figure above) has 6 facets, each with a mirror. It is turned by a DC motor which is clock pulsed from the scanning hardware. Pixel times between 2.5 and 0.6 μs can be reached, but for scanning are two times used, 1 and 2 μs.
4.10.2 Photomultiplier with acrylic Light Collection Module

The detector module consists of an acrylic light collection module, an optical filter and a photomultiplier module (PMM).

The acrylic light collection module, the optical filter and the PMM are cemented together in order to obtain the maximum available light collection efficiency.

The acrylic light collection unit consists of an acrylic light guide, a collection mirror and a mechanical mount supporting simple exchange of the detector module.

The aim of this development is to provide high image quality for EUREF compliance with a detector that can be integrated in a digitizer with maximum similarity to the CR 75.0 digitizer. The image quality is increased by improved light collection efficiency with an acrylic light guide.
4.11 Erasure Unit

1. Halogen lamps (Philips CAPSULEline Pro)
2. Grid for cooling by erasure unit fan
3. KG2 filter for heat protection
4. Front glass (UV filter with sensitive gelatin layer)

The lamps are controlled by the erasure control board and the CS board. The lamps are controlled during work in pairs and also the power supply of 12 V is generated via a single transformer. By initialization of the digitizer every lamp is controlled separately. For erasing the image plate a power input of in total 1000 Watt with 230 V / 50 Hz is present.

The erasure unit fan (placed in the cPCI Rack) is switched on from the MS board at the same time the lamps are switched on. After the last scanned and erased image plate the fan is running a certain time for cooling down the unit.

The lamps are already switched on for 0.5 s before the IP reaches the erasure window. The speed the IP is transported past the erasure unit is varied between image plate begin and end for optimized homogeneity – dependent on speed class and format (Erasure energy per time is determined by means of the demographic data). An image plate format of 35 x 43 cm is transported centered past the erasure front glass. The maximal distance from image plate to erasure front glass is 20 mm + 5 mm.

Erasing process is not taking place if scan is in progress or the temperature switch is detecting to high values and interrupts for a cooling delay.
4.12 IP Transport Unit Postscan

The IP transport robot leads the IP along the guide plate and puts the IP back to the cassette in the cassette unit.

The transport robot is guided in the frame of the unit. To move the suction arms back in working position without a conflict with the next IP coming out of the scanner, the robot is moved in a parking position.

figure 30

1 Guide plate
2 Rocker for parking position
3 Suction arms
4 Vacuum unit
5 Cycle of a Cassette in the Digitizer

5.1 Input Buffer

5.1.1 Starting the Machine Cycle by inserting a Cassette

An ADC Cassette with an exposed Image Plate (IP) inside is set in correct orientation into the input buffer.

The light barrier GS516 (long distance light barrier) recognizes the cassette and starts the mechanical process of the digitizer.

A belt drive, moved by motor M514, retracts the cassette and the feed gate opens, run by motor M513.

The light barrier GS518 detects when the cassette is retracted.

5.1.2 Identification of the Cassette and reading the ID-Data

The silver dot at the bottom of the ADC Cassette is identified by the reflex light barrier GS540. If no dot is detected the cassette is refused.

The ID-Data are read out from the chip on the cassette by the RF tag antenna GS538 (1) and the corresponding board (2).
5.2 Cassette Unit 1/2

5.2.1 Taking Cassette in the Cassette Unit

The transport roller (2), moved by motor M201/M206, brings the cassette completely into the cassette unit.

The light barriers GS220 / GS270 recognize the cassette and start the belt motor M205 / M210 to transport the cassette.

The light barrier GS222 / GS278 (long distance light barriers) (1) detects when the cassette is retracted to the cassette unit.

The light barrier GS224/GS274 (3) activates the clamping mechanism.

5.2.2 Clamping the Cassette

The cassette is lowered by M202/M207 when a signal of the light barrier GS214/GS265 comes in.

In the lowered position the light barrier GS224/GS274 for starting the clamp mechanism detects the cassette. The clamp motion is run by M203/M208.

The light barrier GS230/GS280 detects when the cassette is clamped.

In the clamped position the light barrier GS228 / GS277 detects the start for the opening mechanism (2).
5.2.3 Opening the Cassette

The cassette lid is opened by the stepper motors M204/M209 with a certain number of steps.

The cassette stop switch GS226/ GS276 is set.

![figure 35](image)

5.3 IP Transport Prescan

5.3.1 Positioning of the Transport Robot

Transport robot prescan moves out of start position, detected by GS432, upwards to the cassette unit by motor M403. The working position of the robot is detected by GS430.

The suction arms (1) are moved in the right position by motor M402. The positioning of the suction cups on the IP (2) is detected by GS 426 and GS424.

The vacuum pump GS420 (3) starts to build up low pressure.

![figure 36](image)
5.3.2 Taking out the IP

By opening the magnetic valve MG422 the vacuum is transferred to the suction cups and the IP is sucked.

The IP is taken out of the cassette and moved down to the scan unit by motor M403.

By passing the light barrier GS432 the scan rollers open and start to turn, driven by motor M621.

---

5.3.3 Transporting IP to the Scanner

The transport robot prescan transports the IP to the scan unit.

The vacuum stops, the IP (2) is falling down and is guided to the scan rollers (1).
5.4 Rotation Unit

While the IP is scanned the cassette unit is turned 180° by M212. The starting position is detected by GS206, the final position after turning by GS204.

The cassette itself stays clamped on the same cassette unit.

Therefore the IP returns after the scan and erasure process into the same cassette it was placed before.

5.5 Scan Unit

5.5.1 Positioning of the IP

The IP is positioned for the scan process by motor M622 moving the alignment fingers (1). The position is checked by light barrier GS616.

The IP is loaded into the scan unit and the slow scan process is started by GS626 (long distance light barrier), giving the begin of scan signal (BOS).

If also the begin of line signal, activated when the laser touches a PIN diode inside the optic module, is given the scanning starts.
5.5.2 Scanning the IP

The IP is moved through the scanner by M702.
The scan process is split into a fast and a slow scan direction.
The laser power of the laser diodes are lead to the IP via optical lenses and a polygon. The light emitted from the IP is transferred by a light collector module to the photo multiplier.

![figure 41]

5.5.3 Unloading the IP from Scan Unit

After the scan process, the IP is detected by GS614 (2) and positioned by motor M612 moving the alignment mechanics (1). The position is controlled by light barrier GS612.

![figure 42]

![figure 43]
5.6 IP Transport Postscan / Erasure Unit

5.6.1 Positioning of the Robot

The transport robot postscan is moved by the motor M401 out of the start position, detected by light barrier GS416, into working position controlled by GS414.

The suction arms are positioned by motor M400. The start position of the suction arms is detected by the light barrier GS410 and the final position of GS408.

The vacuum pump GS402 of the transport robot postscan starts.

To suck the IP the magnetic valve MG411 is opened.
5.6.2 Transporting the IP to Erasure Unit

The IP (1) is moved by motor M401 of the transport robot postscan to the erasure unit (2).

The erasure process starts, if there is no cooling delay necessary.

The IP passes the erasure lamps (3) in a certain speed. The speed is dependent on the format of the cassette. This information is given by the chip on the Cassette and was read out at the beginning of the cycle.

There are different speeds to vary homogeneity and intensity of the erasure effect on the IP.

The image information (2) on the IP is erased and the blank IP (1) can be used for another X-ray exposure.
5.6.3 **Putting the IP back into the Cassette**

The suction arms of the transport robot postscan put the IP back into the cassette. The vacuum stops and the suction cups are sliding away from the IP. For the direction of the movement, see the arrows in figure beside.

The suction arms are moving away from the IP, driven by motor M400 (1) and the robot goes back to parking position by M401 (2). The way to the parking position is guided by opening the two magnetic valves MG401 and MG402 on the guiding rail of the transport unit frame.

The parking position is detected with one light barrier on each side, GS404 and GS406. This movement is shown in the lower cycle of figure 38.

In this position the suction arms are moved to the right angle to take the next IP.

The robot moves finally in start position to wait for the next IP.
5.7 Cassette Unit

5.7.1 Moving Cassette to Output Buffer

Closing, unclamping and lifting the cassette upwards, works in reverse order than described at 4.2.2 and 4.2.3 of this chapter.

The cassette is closed by motor M204/M209 and the closed status is detected by light barriers GS228/GS277.

The clamping (1) is removed by motor M203/M208 and detected by light barriers for clamping position GS230/GS280 and start position GS224/274.

The motor M202/M207 of the cassette unit transports the cassette upwards.

The transport belt is turned by M205/M210 to move the cassette to the output buffer. The position of the belt is detected by the light barrier GS220/GS270.

5.8 Output Buffer

5.8.1 Transporting the Cassette to output

The transport belt of the cassette unit (1) moves the cassette to the output buffer.

The cassette is detected at the output buffer by GS558.

The transport roller, powered by motor M515 and controlled by light barrier GS564, brings the cassette outside the output buffer.
5.8.2 Putting out the Cassette

The light barrier GS560 (long distance light barrier) recognizes the end of the cassette cycle.

To avoid a blockade of cassettes by scanning one after another, the lever (1) of the output buffer, controlled by light barrier GS554 and powered by motor M516, pushes the outgoing cassette aside.

![Figure 51](image-url)
6 Software Architecture

6.1 Diagnostics Software

The Diagnostics Software is a tool which helps to find defective parts in the digitizer. A dialog with requests and questions via the display guides you through the test of a module.

All components of a module (light barriers, boards, motors, valves, mechanics...) are checked during a test. If the result is satisfying, the module is working in a normal operating mode. If a problem is detected a problem description and a repair proposal comes up on the display.

Modules tested by Diagnostics Software:

<table>
<thead>
<tr>
<th>Input buffer and R/F-TAG</th>
<th>Opens input door and moves cassette to position 'silver dot detection'; tests R/F-Tag reading and writing. Identified cassette 35 x 43 cm is for this test needed!</th>
</tr>
</thead>
<tbody>
<tr>
<td>Cassette module 1</td>
<td>Turns cassette module 1 to right side; opens, clamps and closes cassette; turns cassette module 1 to left side and shifts cassette out. A cassette 35 x 43 cm is for this test needed!</td>
</tr>
<tr>
<td>Cassette module 2</td>
<td>Turns cassette module 2 to right side; opens, clamps and closes cassette; turns cassette module 2 to left side and shifts cassette out. A cassette 35 x 43 cm is for this test needed!</td>
</tr>
<tr>
<td>Rotation unit</td>
<td>Turns cassette module 1 to right side and then cassette module 2 to right side.</td>
</tr>
<tr>
<td>Prescan transport+vac.</td>
<td>Opens cassette on right side; tests prescan valves, vacuum pump and vacuum switch; moves robot up to cassette module; sucks image plate and releases it again; moves robot down to scanner; closes cassette again. A cassette 35 x 43 cm with an image plate inside is for this test needed!</td>
</tr>
<tr>
<td><strong>Scanner</strong></td>
<td>Turns scanner rollers; moves pre-/post-alignment drives and rollers-lift home.</td>
</tr>
<tr>
<td>-------------</td>
<td>-----------------------------------------------------------------------------</td>
</tr>
<tr>
<td><strong>Postscan transport</strong></td>
<td>Clamps cassette on right side and turns cassette to left side; tests postscan valves, vacuum pump and vacuum switch; moves robot up to cassette module; sucks image plate and releases it again; moves robot down to scanner; closes cassette again and shifts cassette out. A cassette 35 x 43 cm with an image plate inside is for this test needed!</td>
</tr>
<tr>
<td><strong>Erasure unit</strong></td>
<td>Switches on fan, then switches on all 10 lamps.</td>
</tr>
<tr>
<td><strong>Image transmission</strong></td>
<td>Checks which destinations are responding, sends the test image to all responding destinations and checks the result of the image transmission. Considers rerouted destination.</td>
</tr>
</tbody>
</table>
6.2 Web Pages

The Software of the digitizer allows access from the Internet to the service level of the machine. The access via a graphic User Interface (ADC web pages) is part of the service concept. The web pages follow the structure of the User Terminal.

Access via web pages guarantees a convenient and fast service by making use of standard tools. The usage of different ports for these ways allows working simultaneously with FTP, HTTP, and TelNet.

Further information, see Chapter 3.2

6.3 Floppy disk delivered with a Spare Part

Spare parts which are sent with a floppy, need to be included in the system via software. The floppy e.g. of the optic module contains specific settings of production calibration and data of the spare part. This information need to be installed after the spare part is mounted in the digitizer. For other spare parts sent with a floppy only the information for the info counter is included.

CR 75.0 Type 5146/105 up to SN 6499, CR 85-X Type 5148/100 up to SN 3999:
The floppy is put into the floppy drive of the cPCI-Rack and the installation starts automatically. The information concerning the spare part is integrated in the system.

CR 75.0 Type 5146/105 as of SN 6500, CR 85-X Type 5148/100 as of SN 4000:
Copy the content of the floppy disk to a USB Memory Stick. Connect the USB Memory Stick to the USB-port on the Revive Board in the cPCI-Rack and the installation starts automatically. The information concerning the spare part is integrated in the system.
6.4 Data Flow

![Diagram showing data flow]

Legend:
- PMT: Photomultiplier Tube
- Laser: Laser Diode
- I/V converter: Current-to-Voltage Converter
- Lowpass Filter: Lowpass Filter
- Raw Data: Raw Data
- Processing Station: Processor Station
- Harddisk: Hard Disk
- Ethernet: Ethernet Interface
- cPCI Backplane: CompactPCI Backplane
- Service PC: Service Personal Computer

Figure 52
Conversion of emitted light into current

Conversion from current to voltage in the I/V - converter

IP data
Cassette data
Exposure
Destination
Patient

R/F Tag on the cassette

 Photomultiplier

Calculation of:
Scanspeed
Voltage for high tension of PMT
Antialiasing-filter-frequency

Revolutions per minute of Polygon

Voltage adaptation for high tension of PMT

Start of scan with slow scan speed = constant

Signal compression for grey scale coordination (square rooted)

Signal filtering to avoid aliasing

Conversion from analog to digital (14bit)

Scan Master board

Raw image data and demographic data via network to processing station

Raw image data in RAM

Storage of raw image data on HDD

figure 53
7 **Calibration Principle**

There are two different calibrations to work out with the CR85-X in the field:

- The **IP Center Calibration**, which is necessary when:
  - The optic module has been exchanged.
  - The pin diode board (GS 626) and/or the light barrier IR Receiver (GS 628) have been replaced.
  - White borders on the Mammo diagnostic images are present.*

- The **Shading Calibration** which is responsible for the image quality is necessary when:
  - IP Center Calibration has been performed.
  - The optic module has been exchanged.
  - The LISA module (photomultiplier with light collector) has been exchanged.
  - The scan unit has been replaced.
  - Unacceptable line artifacts (stripes) in slow scan direction are still visible on the diagnostic image after cleaning the scan area.

* Only on 24 x 30 cm and 18 x 24 cm cassette formats. The white border is present only on one side of the image.

7.1 **IP Center Calibration (BOL/BOS Adjustment)**

The IP center calibration adjusts two different scan signal settings in one process, the begin of line (BOL) signal for the fast scan direction and the begin of scan (BOS) signal for slow scan direction. Both signals in combination are responsible for the area which is scanned and where pixels are created.

7.1.1 **BOL**

The BOL sensor is a pin diode placed in the optic module. It controls the switching off and on of the laser. The sensor is beside the IP, therefore the laser beam hits the sensor before the IP. Out of the defined distance between the sensor and the border of the IP the moment of reading out the pixel lines on the IP is set.

7.1.2 **BOS**

The BOS sensor is a long distance light barrier which is placed at the bottom part of the scan unit. The light barrier gives the signal to start the scan process in slow scan direction. When the IP reaches the sensor it is detected and then passes a fixed distance to the begin of scan line, then the scan process starts.
7.1.3 Calibration Procedure

The IP center calibration is worked out with an IP format smaller than 35 x 43 cm. In reference to this biggest format the borders around the scanned IP are detected.

The distance corresponding to the BOS signal is measured from the geometrical reference to the border where the scanning of the IP starts. The ideal distance is defined with 5 mm.

The both distances measured to adjust the BOL signal must be equal, means the IP is scanned in centered position.

7.2 Shading Calibration

Inhomogeneties of the light collector and the photomultiplier require a position dependent calibration of the scan line. This pixel wise line calibration evens out differences in the transmission behavior of the light collector by calculation.

Each scanned pixel in a line is corrected arithmetically by its corresponding correction value (shading correction). This is done for each of the three speed classes 600, 200, and 75.

A number of lines of a flat field image are averaged and scaled to the maximum pixel value. All the lines need to be in a certain range to make the calibration successful, if not the error is displayed at the user terminal.
The calibration curves can be viewed by using a web browser. (see chapter 3.2)

Three curves for each format are displayed in one image and distinguished by three different colors.

The y-axis of the coordinate system shows the **Scan Average Level** (SAL) which is the digital value (gray scale) of a pixel and is one of the criteria for a successful calibration. The x-axis shows the number of pixels.

**NOTE:**
Scan average level (SAL) values have been converted into SAL log or PVI log from NX 2008 Workstation Software on.

For details please refer to Service Bulletin No. 07 ([Intranet link](#) / [Extranet link](#)).
The chapter "Software / Hardware Compatibility" has been replaced by following documents:

- Solution Structure Data Document, Document ID* 30781759
  (Intranet Link / Extranet Link)
- CR/DR Interoperability Matrix, Document ID* 31333326
  (Intranet Link / Extranet Link)

* Access the document by entering the document ID in the Agfa HealthCare Library search window, or follow the direct link.
Purpose of this document
This document contains safety guidelines, general repair instructions and contains all product specific safety notes of this Service Documentation.

Document History

<table>
<thead>
<tr>
<th>Edition. Revision</th>
<th>Release Date</th>
<th>Changes compared to previous version 1.0</th>
</tr>
</thead>
</table>
| 2.0               | 02-2007      | • Layout changes as this Service Documentation is also valid for CR 75.0 Type 5146/105 (as of SN ≥ 6000).  
• Some Generic Safety directions have been removed as they are available in “Generic Safety Directions” document  
• Product specific safety notes have been updated |

Referenced Documents

<table>
<thead>
<tr>
<th>Document</th>
<th>Title</th>
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<tbody>
<tr>
<td>Service Bulletin.</td>
<td>CR 75.0 Type 5146/105 (as of SN ≥ 6000) introduced, DD+DIS028.07E</td>
</tr>
</tbody>
</table>
WARNING:
Improper operation or service activities may cause damage or injuries.

INSTRUCTION:
(1) Read the "Generic Safety Directions" document
(see MEDNET GSO => General Info => Agfa HealthCare => Publications => Service Manual) prior to attempting any operation, repair or maintenance task on the equipment.
(2) Strictly observe all safety directions within the "Generic Safety Directions" and on the product.
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1 Safety Directions

1.1 General
With every repair work check the following points visually:

- Condition of the insulation of the mains plug / mains cable.
- Effects of the strain relief for the mains cable.
- Efficiency of the protective earth on metal panel parts (protective earth connected and spring contacts OK).
- Correct condition of the protection covers.

1.2 To be considered upon Repairs on the Digitizer
The machine must be protected against accidental activation during repair work. For this purpose we recommend to attach the following sign on the main switch while repairing the machine.

![Sign](image)

1.3 To be considered with mechanical Tests of Stepper Motor controlled Drive Units
If a stepper motor driven shaft must be turned for checking a mechanical function, make sure to disconnect the stepper motor first on the corresponding control board. (to avoid destruction of the stepper motor control board by induction).

If this is not possible, turn the stepper motor only slowly.
1.4 Safety Instructions for Laser Products

WARNING:
Laser beam! Risk of serious eye damage!
Avoid direct and indirect eye contact.
Do not open the optic module.
Do not hold any tools in the laser beam - risk of reflection.

Observe the CAUTION instructions on the Optical Module label

DANGER:
Risk of injury from moving parts of rotation drive.
The rotation drive turns very quickly!
Keep hair, hand and clothing clear when machine is running with the doors open.
1.6 Safety Switch of the Digitizer

The digitizer has one safety switch (interlock switch) to ensure the customer’s safety.

![Diagram of safety switch](image)

The power supply for all electronic components, except the PCI-Rack, is interrupted when the Digitizer is opened. The PCI-Rack remains energized in order to allow file uploads/downloads.

**WARNING:**

If the safety switch is overridden with a service key there are risks of injuries.

Keep your hair, hands and garments away from the device.

Remove service key before the device is handed over to the customer.

Laser beam! Risk of serious eye damage!

Avoid direct and indirect eye contact with the laser beam.

Do not hold any tools in the laser beam - risk of reflection.

Consider that the service key must be removed again before the doors are closed. After use of the service key, the function of the safety switch has to be checked.
1.7 Protective Measures for Electronic Components

CAUTION:
Static discharge! Electrical components may be destroyed:
For the repair on electrical components, wear a grounding strap (CM+9 9999 0830 0) around the wrist and connect the other end of this strap on a grounded conducting metal piece.

Since there is a frequent problem with electrical components which are destroyed by static discharge, protective measures must be taken to avoid this problem. For the repair on electrical components it is necessary to wear the grounding strap around the wrist and connect the other end of this strap on a position of the frame which is free of lacquer.

Be attentive, that the frame is grounded!
2 Product specific Safety Notes

2.1 Safety Notes for Installation

**CAUTION:**
Transportation parts can damage the product.
Remove all transportation parts prior to first operation.

**CAUTION:**
Risk of injury when removing the scan unit!  
To remove the scan unit safely, use the digitizer ramp.
Check that both adjustable feet are touching the ground before removal of the scan unit.
2.2 Safety Notes for Cassettes and Image Plates

Observe great care whenever removing the image plate from the ADC Compact cassette. Refer to the cleaning procedure described in the user manual.

CAUTION:
Wrong screen cleaner may damage the Image plate.

Do not use the AGFA CR phosphor plate cleaner to clean the CR MM3.0 Mammo image plates. Use PROSAT wipers instead.

WARNING:
Poor image quality caused by incorrect cassette initialization.

Initialize the cassette/plate as described in the corresponding user manual.

CAUTION:
Image quality may be inadequate when using wrong cassettes:

Only cassettes with both labels “CR MD4.2 Extremities” and “Extremities code XX” must be used for the Extremities application (XX depends on the plate sensitivity SAL).

Other cassettes must not be used.
2.3 Safety Notes for Replacement of Parts

**WARNING:**
Risk of electric shock!
Switch off the digitizer before performing any service interventions at the digitizer.

**CAUTION:**
Do not try to unscrew the screw in the left upper position (see arrow)!
It is secured by lacquer.

**CAUTION:**
Risk of injury when removing the scan unit!
To remove the scan unit safely, use the digitizer ramp.
Check that both adjustable feet are touching the ground before removal of the scan unit.

**WARNING:**
Risk of electric shock!
Make sure that the digitizer is switched off, before you remove the optic module.

**CAUTION:**
Risk of injury when removing the scan unit!
To remove the scan unit safely, use the digitizer ramp.
Check that both adjustable feet are touching the ground before removal of the scan unit.
CAUTION:
Risk of damage!
Photomultiplier and light collector are glued and must be treated as one component.

WARNING:
Risk of electric shock!
Switch off the digitizer and disconnect the machine from the mains.
Safety instructions for electronical parts see Chapter 3.1

DANGER:
Risk of injury from moving parts of rotation drive.
The rotation drive turns very quickly!
Keep hair, hand and clothing clear when machine is running with the doors open.
2.4 Safety Notes for Maintenance

CAUTION:
Risk of damaging the scan unit.
Do not remove the scan rollers. Clean the scan rollers in place by moving the slow scan motor manually.

CAUTION:
Risk of damage when using wrong cleaning method.
Do not use any fluid for cleaning of the inner side of the large glass plate since it is coated with a gelatin layer.

CAUTION:
Wrong screen cleaner may damage the Image plate.
Do not use the AGFA CR phosphor plate cleaner to clean the CR MM3.0 Mammo image plates. Use PROSAT wipers instead.

WARNING:
Poor image quality caused by incorrect cassette initialization.
Initialize the cassette/plate as described in the corresponding user manual.
3 Markings and Labels

Type B equipment:

Indicates that the CR 85-X complies with the limits for type B equipment.

Supplementary protective earth connector:

Provides a connection between the CR85-X and the potential equalization busbar of the electrical system as found in medical environments. This plug should never be unplugged before the power is turned off and the power plug has been removed.

Intergrounding connector:

Provides a connection between the Digitizer and other equipment which might exhibit minor ground potential differences. These differences may degrade the quality of communication between different equipment. Never remove connections to this terminal.

Protective earth (ground):

Provides a connection between the Digitizer and the protective earth of the mains. Do not remove this connection, because this will have a negative influence on the leakage current.

Power on

Power off:

Note that the power cord has to be disconnected from the wall outlet in order to disconnect the unit entirely from the mains.

CAUTION:

Precautions for use in USA only:

Make sure that the circuit is single-phase center-tapped, if the Digitizer is connected to a 240 V / 60 Hz source instead of a 120 V / 60 Hz source.
3.1 Type Label

The CR 85-X has two type labels applied to frame

- One at the upper left corner of the frame
- One at the rear side beneath the power supply socket (see figure 5)

![figure 5]
3.2 Warning Label on the Input Buffer of the Digitizer

Risk of injury during cassette insertion:
Fingers if they are caught between the cassette and the edge of the input slot may become trapped.
Insert the cassette in the input buffer as described in the User Manual.
At all times, keep your fingers clear of the input slot.
Note warning label at the Input buffer of the digitizer.

The warning label (see figure 6) is placed in the upper left corner of the front side of the input buffer; details see figure 7.
3.3 Warning Label on the Erasure Unit

WARNING:
The erasure unit is hot - up to 200 °C: Risk of burns.
Avoid contact with the Erasure Unit.
Observe the relevant sticker on the Erasure Unit. (see figure 8)

![Figure 8: Label position](image-url)
3.4 Warning Label on the Photomultiplier Module

CAUTION.
Photomultiplier is fragile: Risk of damage.
Care must be taken. (see figure 9)

figure 9: Label position
Purpose of this document
This document describes tools and auxiliary means for the digitizer.

Document History

<table>
<thead>
<tr>
<th>Edition Revision</th>
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Referenced Documents

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<tr>
<td>Service Bulletin</td>
<td>CR 75.0 Type 5146/105 (as of SN ≥ 6000) introduced, DD+DIS028.07E</td>
</tr>
</tbody>
</table>

CR 85-X
Type 5148/100

CR 75.0
Type 5146/105
(as of SN ≥ 6000)
WARNING:
Improper operation or service activities may cause damage or injuries.

INSTRUCTION:
(1) Read the "Generic Safety Directions" document (see MEDNET GSO => General Info => Agfa HealthCare => Publications => Service Manual) prior to attempting any operation, repair or maintenance task on the equipment.
(2) Strictly observe all safety directions within the "Generic Safety Directions" and on the product.
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2  SERVICE PC (STANDARD).....................................................................................................5
3  SERVICE PROGRAM FOR THE DIGITIZER........................................................................7
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   4.1.4  Navigation Instructions...........................................................................................11
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1 **Recommended Tools and Test Equipment**

In addition to the common tools every service engineer is carrying in his tool box, the following auxiliary equipment is required for the service on the digitizer components:

<table>
<thead>
<tr>
<th>Equipment</th>
<th>Spare Part Number</th>
<th>Application</th>
</tr>
</thead>
<tbody>
<tr>
<td>Service Laptop</td>
<td>-</td>
<td>service program</td>
</tr>
<tr>
<td>Interface cable RS232, 9pin / 25 pins SUB D</td>
<td>CM+9 5120 9030 0</td>
<td>connection service PC - Digitizer</td>
</tr>
<tr>
<td>Ground tape</td>
<td>CM+9 9999 0830 0</td>
<td>replacement of printed circuit boards / EPROMs</td>
</tr>
<tr>
<td>Safety lacquer</td>
<td>-</td>
<td>to be used after electronic or mechanical adjustments</td>
</tr>
<tr>
<td>CCM Tool</td>
<td>See Med Net GSO library</td>
<td>configuration tool</td>
</tr>
<tr>
<td>Leeds test phantom</td>
<td>FWW41</td>
<td>test exposures</td>
</tr>
<tr>
<td>Test Images CD-ROM for CR 85-X</td>
<td>CM+9 5145 3055 0</td>
<td>contains four test images: flatfld, flatfld2, testimg, tsheet</td>
</tr>
<tr>
<td>Cu filter</td>
<td>CM+9 5155 1015 2</td>
<td>test exposures</td>
</tr>
</tbody>
</table>
2 Service PC (Standard)

The service PC is used:
(1) to create the adc.cpf file with the CCM tool
(2) to do service via terminal emulation
(3) to run the show error program

As service PC you can use any commercially available laptop.

Service PC connection: at a RS232 interface beside the mains switch of the ADC Digitizer.
The ADC service concept offers four different ways of access to the digitizer. Beside the two most common ways via local keypad and Service PC, the on-site presence is necessary, remote access via LAN(3) and Internet (4) gains more or less importance.

1) Local keypad
The local keypad or operation terminal is part of the digitizer and allows on-site access to the machine. All commands are directly entered via 10 keys on the keypad.

2) Service PC
The Service PC can be connected to the digitizer via the serial interface RS232. Commands are entered in command lines (CU).

3) PC in LAN
The digitizer can be called from any PC connected to LAN.

Three different ways of access are offered:

- Input via ftp: only one connection at the same time

- Input via TelNet: only one connection at the same time

- Dial-up connection to the digitizer. Prerequisites: Access to Internet, Service Host/Modem, (password required).

Three different ways of access are offered (see item 3).
# 3 Service Program for the Digitizer

## 3.1 Overview

<table>
<thead>
<tr>
<th>Service Level 1</th>
<th>Service Level 2</th>
<th>Service Level 3</th>
</tr>
</thead>
<tbody>
<tr>
<td><strong>INFO</strong></td>
<td>1 Device info</td>
<td>1 Shading Calibration</td>
</tr>
<tr>
<td></td>
<td>2 Network info</td>
<td>2 IP Center Calibration</td>
</tr>
<tr>
<td><strong>MAINTENANCE</strong></td>
<td>2 Calibration</td>
<td>3 Test and Adjust cycle</td>
</tr>
<tr>
<td></td>
<td>1 SAL Inspection</td>
<td>1 Scan with transmission</td>
</tr>
<tr>
<td></td>
<td></td>
<td>2 Scan cycle – no image</td>
</tr>
<tr>
<td></td>
<td></td>
<td>3 Scan – no era, no img</td>
</tr>
<tr>
<td></td>
<td>4 Handling Cycle</td>
<td>4 Adjustment Cycle</td>
</tr>
<tr>
<td></td>
<td>5 Adjustment Cycle</td>
<td></td>
</tr>
<tr>
<td></td>
<td>4 Confirm Maintenance</td>
<td></td>
</tr>
<tr>
<td></td>
<td>5 Confirm Repair</td>
<td></td>
</tr>
<tr>
<td></td>
<td>6 Clear Infocounter</td>
<td></td>
</tr>
<tr>
<td></td>
<td>7 Confirm Modification</td>
<td></td>
</tr>
<tr>
<td></td>
<td>8 Confirm Installation</td>
<td></td>
</tr>
<tr>
<td><strong>SAVE on floppy</strong></td>
<td>1 Infocounter file</td>
<td></td>
</tr>
<tr>
<td></td>
<td>2 Machine-specific data</td>
<td></td>
</tr>
<tr>
<td></td>
<td>3 Service report</td>
<td></td>
</tr>
<tr>
<td></td>
<td>4 Session files</td>
<td></td>
</tr>
<tr>
<td></td>
<td>5 cpf file</td>
<td></td>
</tr>
<tr>
<td></td>
<td>6 Alarm log file</td>
<td></td>
</tr>
<tr>
<td><strong>SHOW error</strong></td>
<td>1 Explain error code</td>
<td></td>
</tr>
<tr>
<td></td>
<td>2 Error hit list</td>
<td></td>
</tr>
<tr>
<td><strong>INSTALL from floppy</strong></td>
<td>1 Software</td>
<td></td>
</tr>
<tr>
<td></td>
<td>2 Machine-specific data</td>
<td></td>
</tr>
<tr>
<td></td>
<td>3 PMT settings (mfa/mfb)</td>
<td></td>
</tr>
<tr>
<td></td>
<td>4 Optics parameters</td>
<td></td>
</tr>
<tr>
<td></td>
<td>5 Scanner parameters</td>
<td></td>
</tr>
<tr>
<td></td>
<td>6 cpf file</td>
<td></td>
</tr>
<tr>
<td></td>
<td>7 language files</td>
<td></td>
</tr>
<tr>
<td></td>
<td>8 HW modification ID</td>
<td></td>
</tr>
<tr>
<td></td>
<td>9 Erasure Unit</td>
<td></td>
</tr>
</tbody>
</table>
### Service Level 1 | Service Level 2 | Service Level 3
---|---|---
6 CONFIGURE | 1 Local network ID |  
2 User terminal language |  
3 Active Alert System | 1 Alert system status |  
2 Alert destination |  
3 Send test alert |  
4 Add-on applications | enable/disable Mammography |  
7 DIAGNOSTICS | 1 Scanning and signals |  
2 Mechanical modules | 1 Input buffer & R/F TAG |  
2 Cassette module 1 |  
3 Cassette module 2 |  
4 Rotation unit |  
5 Prescan transport + vac. |  
6 Scanner |  
7 Postscan transport |  
3 Erasure Unit |  
4 Image transmission |  
8 Checks | 1 System check |  
2 Check laser | 1 Optical Path * |  
2 Laser power on IP |  
3 Check destinations | Ping to ... |  
4 Check disk |  
5 Send flatfield |  
6 Send jitter pattern | 1 Calibration pattern |  
2 Banding pattern |  
7 Check I/O-bus |  
8 Send Testimage | 1 Mammo Testimage 1 |  
2 Mammo Testimage 2 |  
3 Extremity Testimage |  

The optical fiber has been omitted, but the presence of the laser beam can still be validated by visual inspection through the opened input rollers.

Mind the safety instructions for laser radiation.
4 Remote Service via ADC Web Pages

4.1 General Information

Access for service interventions is possible on four different ways:

(1) locally via keypad.
(2) remotely via terminal emulation (RS232 Interface), e.g. xt, hyperterminal.
(3) remotely via a PC in LAN (telnet).
(4) remotely via a dial-up connection (ppp).

This document describes the access via a graphic User Interface (ADC web pages); item 3 and 4.

The ADC web pages complete the service concept of HE GSO. They follow the structure of the well-known User Terminal.

Access via web pages guarantees a convenient and fast service by making use of standard tools. The usage of different ports for these ways allows working simultaneously with FTP, HTTP, and TelNet.

4.1.1 What are HTML Pages?

HTML stands for Hyper Text Markup Language. It is a programming language for the creation of web pages for the Internet. HTML defines layout, fonts and colors of the page and integrates multimedia functions such as graphics, animations or hyperlinks. A special web browser is needed to view a HTML page.

4.1.2 Prerequisites

(1) direct network connection or dial-up network connection; TCP / IP (e.g. Service Host).
(2) digitizer software ACP_4005 or higher loaded
(3) web browser installed (recommended: > Netscape Navigator 4.0; Internet Explorer supports all functions except file transfer).
4.1.3 How to start HTML Pages of a Digitizer

(1) Make sure that the digitizer you want to examine is switched on and you can access it remotely.

(2) Open your web browser.

(3) Enter the IP address of the digitizer in the URL address field of your browser.

(4) You will be asked to enter a user name and a password. If you do not know the proper password, please contact GSC Munich.

→ Result: HTML pages will open with the Welcome Page on your screen.
4.1.4 Navigation Instructions

HTML pages are structured in a three-frames layout. The top frame is static and displays information about the digitizer and its location. The lower left frame is the navigation frame and displays a set of topics. Information about a selected topic will open in the main frame.

In the main frame most of the information pages are equipped with a "Home" link and a "Back" link. "Home" leads back to the Welcome Page. "Back" returns to the primarily selected page.

After a successful login the Welcome Page opens:

![Welcome Page](image)

The software display shows an ADC Compact Plus instead of a CR 85-X. This has no impact from a technical point of view.
4.2 Functions of ADC Web Pages: Overview

<table>
<thead>
<tr>
<th>1st Level</th>
<th>2nd Level</th>
<th>Comment</th>
</tr>
</thead>
<tbody>
<tr>
<td>Show Info</td>
<td>Device Info</td>
<td>Typical info on the device, e.g. type.</td>
</tr>
<tr>
<td></td>
<td>Device Status</td>
<td>Emulates the User Interface; shows the User Terminal in current status.</td>
</tr>
<tr>
<td></td>
<td>User Terminal Messages</td>
<td>Like Device Status</td>
</tr>
<tr>
<td></td>
<td>Error Messages</td>
<td>Shows a history of errors that occurred during operation, latest error on top.</td>
</tr>
<tr>
<td></td>
<td>Network Info</td>
<td>Shows network info, e.g. hostname, IP address.</td>
</tr>
<tr>
<td></td>
<td>Test Report</td>
<td>Shows and reports history on performed local service interventions on device. Latest on top.</td>
</tr>
<tr>
<td></td>
<td>Info Counter</td>
<td>Shows detailed info on device, e.g. SW-version, serial number, modifications.</td>
</tr>
<tr>
<td></td>
<td>Scanner</td>
<td>Shows calibration lines in graphic format for various resolutions (mainly for production purposes).</td>
</tr>
</tbody>
</table>

NOTE:
When selecting files for downloads, these files are first zipped and copied to the download area (adc_c:\dl\). From the download area, the zip-files can be downloaded to a directory of your HDD.
### Upload

<table>
<thead>
<tr>
<th>Comment</th>
</tr>
</thead>
<tbody>
<tr>
<td>Allows to upload the Operating System (<code>aos*.zip</code>), Application Software (<code>app*.zip</code>) or Error Messages and Diagnostics (<code>err*.zip</code>). Software patches (<code>patx.zip</code>) can be uploaded, too.</td>
</tr>
</tbody>
</table>

| Language Files | uploads language files to customize the system language. |
| CPF File       | uploads the cpf-file                                      |
| Machine Specific Parameters | uploads machine-specific parameters (backup)       |
| Any File       | allows an upload of any file.                            |

### Configure

<table>
<thead>
<tr>
<th>Comment</th>
</tr>
</thead>
<tbody>
<tr>
<td>Allows changes in the network settings.</td>
</tr>
<tr>
<td>The standard language for normal user and key operator of the system can be changed.</td>
</tr>
</tbody>
</table>

**IMPORTANT:**
The changes confirmed under **Local Network ID** and **User Terminal Language** are activated immediately.

### Date and Time

<table>
<thead>
<tr>
<th>Manual setting of date and time</th>
</tr>
</thead>
<tbody>
<tr>
<td>Date and Time</td>
</tr>
<tr>
<td>Checks</td>
</tr>
<tr>
<td>Quick Check</td>
</tr>
<tr>
<td>Automatic selftest of the device. This test is recommended to be run as first step in troubleshooting.</td>
</tr>
<tr>
<td>Check Laserpower</td>
</tr>
<tr>
<td>Shows the history of the laser power</td>
</tr>
<tr>
<td>Check Destinations</td>
</tr>
<tr>
<td>Sends a ping to the Processing Stations defined in the cpf-file. Checks and displays these destinations, including their host names and their status.</td>
</tr>
<tr>
<td>Check Disk(s)</td>
</tr>
<tr>
<td>Checks the hard disk or floppy drive; comparable to chkdsk in MS-DOS. Being a dynamic process, this cannot be displayed in HTML.</td>
</tr>
</tbody>
</table>
### Repair and Service
Tools and Auxiliary Means

<table>
<thead>
<tr>
<th>1st Level</th>
<th>2nd Level</th>
<th>Comment</th>
</tr>
</thead>
<tbody>
<tr>
<td>Image Queue</td>
<td>Show Queue</td>
<td>Displays all the images in the queue; &quot;Patient Name&quot;, &quot;Location on Disk&quot; and &quot;Status&quot; are listed on the display.</td>
</tr>
<tr>
<td>Delete Queue Entries</td>
<td></td>
<td>Displays all the images that can be deleted.</td>
</tr>
<tr>
<td>Reroute</td>
<td></td>
<td>Reroutes all further incoming images to a selected destination.</td>
</tr>
<tr>
<td>Retransmit</td>
<td></td>
<td>Resends an image when the job is in the status &quot;error&quot;. All the images that can be retransmitted are listed on the display.</td>
</tr>
<tr>
<td>Send Image</td>
<td>Test Image</td>
<td>Each test image (&quot;mosaic image&quot;) can be sent to any of the Processing Stations in the network configured in the cpf-file.</td>
</tr>
<tr>
<td>Flatfield (Calibration Pattern)</td>
<td></td>
<td>Each flatfield can be sent to any of the Processing Stations in the network configured in the cpf-file.</td>
</tr>
<tr>
<td>Flatfield (Banding Pattern)</td>
<td></td>
<td>Each flatfield can be sent to any of the Processing Stations in the network configured in the cpf-file.</td>
</tr>
<tr>
<td>Testsheet</td>
<td></td>
<td>Each test sheet can be sent to any of the Processing Stations in the network configured in the cpf-file.</td>
</tr>
</tbody>
</table>

**IMPORTANT:**
The following item **Advanced Access** allows access via the command line. It is for advanced users only. Protective mechanisms are no longer in force.

<table>
<thead>
<tr>
<th>1st Level</th>
<th>2nd Level</th>
<th>Comment</th>
</tr>
</thead>
<tbody>
<tr>
<td>Advanced Access</td>
<td></td>
<td>Additional commands can be entered directly in the command line. Your intervention is not visible for any user. Do not interfere with ongoing user activities!</td>
</tr>
<tr>
<td>Confirm Your Access</td>
<td></td>
<td>This shell updates the infocounter. Please enter this information whenever you finished a service intervention. You can choose between Remote Maintenance and Remote Repair.</td>
</tr>
</tbody>
</table>
► Purpose of this document
This document describes checkpoints for troubleshooting the digitizer.

► Document History

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<thead>
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1.2 Cassette Unit - Checkpoint 2 .....................................................................................6
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1 Checkpoints for Troubleshooting

(1) Check info counters and select the defective module.

(2) Run test as indicated in the respective checkpoint:

The reports are checked by the Diagnostic Software for the selected module. The procedure is not visible on the display of the digitizer only results, problem descriptions and repair proposals are displayed.

If there is no result, check the adjustments of the module in chapter 3.6.

NOTE:

The error numbers of the internal reports are not identical to the error codes shown on the display.
1.1 Input Buffer - Checkpoint 1

Run Diagnostic Software:

7 DIAGNOSTICS
2 Mechanical Modules
1 Input buffer & R/F Tag

- Test input buffer connections
  - Ok
  - Not ok

- Test if X positioning light barrier of motor M513 is clear
  - Ok
  - Not ok

- Move input buffer belt home
  - Ok
  - Not ok

- Move input buffer door home
  - Ok
  - Not ok

- Test if X positioning light barrier of motor M513 is interrupted
  - Ok
  - Not ok

- Open input buffer door
  - Ok
  - Not ok

- Move input buffer belt to prepare position
  - Ok
  - Not ok

- Move input belt slowly to label position
  - Ok
  - Not ok

- Wake up RF-tag reader
  - Ok
  - Not ok
continues Input Buffer – Checkpoint 1

1.2 Cassette Unit - Checkpoint 2

Run Diagnostic Software:

7 DIAGNOSTICS
2 Mechanical Modules
    2 Cassette Module 1
    or 3 Cassette Module 2

The abbreviations CASMODCON, ROTCON, HOMEPOS and XPOS are subprograms and are also checked during diagnose.

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continues Cassette Unit – Checkpoint 2

Test if X positioning light barrier of motor M203/M208 is clear

- Not ok → Timeout when testing X positioning light barrier of motor M203/M208

- Error xxxx occurred when testing X positioning light barrier of motor M203/M208

- Could not close cassette of cassette module x

- HOMEPOS

Closing cassette of cassette module x

- Not ok → Unclamping cassette of module x failed

- HOMEPOS

Unclamping cassette of cassette module x

- Not ok → Moving lift of cassette module x up failed

- HOMEPOS

Moving lift of cassette module x up

- Not ok → Moving belt of cassette module x home failed

- HOMEPOS

Moving belt of cassette module x home

- Not ok → Stopping input rolls of cassette module x failed

- HOMEPOS

Stopping input rolls of cassette module x

- Not ok → Stopping input rolls of cassette module x failed

- HOMEPOS

Test if puls light barrier of GS210S1/GS260S2 is interrupted

- Not ok → Starting input rolls of cassette module x failed

- Error xxxx occurred when testing if puls light barrier of GS210S1/GS260S2 is interrupted

- Timeout when testing if puls light barrier of GS210S1/GS260S2 is interrupted

- Starting input rolls of cassette module x

- Ok

Starting input rolls of cassette module x

- Not ok → Starting input rolls of cassette module x failed

- Ok

Stopping input rolls of cassette module x

- Not ok → Starting input rolls of cassette module x failed

- Ok

Starting input rolls of cassette module x

- Not ok → Stopping input rolls of cassette module x failed

- Ok

Stopping input rolls of cassette module x

- Not ok → Lift of cassette module x is being moved down

- Ok

Lift of cassette module x is being moved down

- Not ok → Unclamping cassette of cassette module x failed

- Ok

Unclamping cassette of cassette module x

- Not ok → Ok

Ok
continues Cassette Unit – Checkpoint 2

1.3 Rotation Unit - Checkpoint 3

Run Diagnostic Software:

7 DIAGNOSTICS
2 Mechanical Modules
4 Rotation Unit

Test connections of rotation module

Move rotation unit home

Get rotation position

Test if clear and interrupt functionality of 0 positioning lightbarrier of motor Mxxx
1.4 Prescan Transport Unit - Checkpoint 4

Run Diagnostic Software:

7 DIAGNOSTICS
2 Mechanical Modules
5 Prescan transport + vac.

The abbreviation ROTCON is a subprogram and is also checked during diagnose. VACUUM and AIRDET are shown after the main program.
continues Prescan Transport Unit – Checkpoint 4

- **Test connections of prescan module**
  - **Initializing prescan module**
    - Not ok: Prescan module could not be initialized
  - **Test if X positioning light barrier of motor M403 is interrupted**
    - Not ok: Error xxxx occurred when testing X positioning light barrier of motor M403 is interrupted
    - Ok: Timeout when testing X if positioning light barrier of motor M403 is interrupted
  - **Test if X positioning light barrier of motor M402 is clear**
    - Not ok: Error xxxx occurred when testing X positioning light barrier of motor M402 is clear
    - Ok: Timeout when testing X if positioning light barrier of motor M402 is clear

- **VACUUM**
  - **Test connections of cassette module**
    - Not ok: Closing opener of cassette module x failed
    - Ok: Closing opener of cassette module x
    - Not ok: Unclamping clamper of cassette module x failed
    - Ok: Unclamping clamper of cassette module x
    - Not ok: Moving up lift of cassette module x failed
    - Ok: Moving up lift of cassette module x
    - Not ok: Moving home belt of cassette module x failed
    - Ok: Moving home belt of cassette module x
    - Not ok: Stopping input rolls of cassette module x failed
    - Ok: Stopping input rolls of cassette module x
    - Not ok: Starting input rolls of cassette module x failed
    - Ok: Starting input rolls of cassette module x
    - Not ok: Stopping input rolls of cassette module x failed
    - Ok: Stopping input rolls of cassette module x
continues Prescan Transport Unit – Checkpoint 4

- Move down lift of cassette module x
  - Ok
  - Not ok
  - Moving down lift of cassette module x failed

- Unclamping cassette of cassette module x
  - Ok
  - Not ok
  - Unclamping cassette of cassette module x failed

- Clamp cassette of cassette module x
  - Ok
  - Not ok
  - Clamping cassette of cassette module x failed

- Open cassette of cassette module x
  - Ok
  - Not ok
  - Opening cassette of cassette module x failed

- Get rotation position
  - Ok
  - unknown
  - Rotation position is unknown

- Initialize rotation module
  - Not ok
  - Initialization of rotation module failed

- Turning cassette module x to input
  - Not ok
  - Turning cassette module x to input failed

- Moving up prescan robot
  - Not ok
  - Start of moving up prescan robot failed

- Prescan robot started to move up
  - Ok

- Waiting for prescan robot to reach upper position
  - Not ok
  - Prescan robot did not reach upper position

- Test if X positioning light barrier of motor M403 is interrupted
  - Ok
  - Not ok
  - Timeout when testing X if positioning light barrier of motor M403 is interrupted

- No vacuum is detected for prescan module
  - Ok

- Switch off vacuum pump of prescan module
  - Not ok
  - Switching off vacuum pump of prescan module failed

- Setting valve of pre/post scan module to vacuum pump
  - Ok
  - Not ok
  - Setting valve of pre/post scan module to vacuum pump failed

- Moving suction cups of prescan module back home
  - Not ok
  - Moving suction cups of prescan module back home failed
continues Prescan Transport Unit – Checkpoint 4

Ok

Test if X positioning light barrier of motor M402 is interrupted

Not ok

Timeout when testing X positioning light barrier of motor M402 is interrupted

Ok

Move down robot of prescan module

Not ok

Starting to move down robot of prescan module

Ok

Waiting for robot of prescan module to finish the movement down

Not ok

Movement down of robot of prescan module failed

Ok

Finishing cycle of prescan module

Not ok

Finishing cycle of prescan module failed

Ok

Test connections of cassette module

Not ok

Close opener of cassette module x

Could not close cassette of cassette module x

Ok

Unclamp clamper of cassette module x

Could not unclamp cassette of module x

Ok

Move up lift of cassette module x

Could not move up lift of cassette module x

Subprogram VACUUM:

Switch off vacuum pump prescan/postscan module

Not ok

Switching off vacuum pump prescan/postscan module failed

Ok

Wait for xxx seconds

Test if air is detected for postscan/prescan module

Not ok

No air is detected for postscan/prescan module

Ok

Set valve of prescan/postscan module to vacuum pump

Not ok

Setting valve of prescan/postscan module to vacuum pump failed

Ok

Wait for xxx seconds

Switch on vacuum pump prescan/postscan module

Not ok

Switch on vacuum pump prescan/postscan module failed
continues Prescan Transport Unit – Checkpoint 4

Ok

Wait for xxx seconds

Test if air is detected for postscan/prescan module Not ok

No air is detected for postscan/prescan module

AIRDET

Ok

Wait for vacuum for postscan/prescan module Not ok

No vacuum is detected for postscan/prescan module

Ok

Set valve postscan/prescan module to air Not ok

Setting valve postscan/prescan module to air failed

Ok

Wait for vacuum for postscan/prescan module Not ok

No vacuum is detected for postscan/prescan module

Ok

Set valve of prescan/postscan module to vacuum pump Not ok

Setting valve of prescan/postscan module to vacuum pump failed

Sub subprogram AIRDET:

Ok

Wait for xxx seconds

Test if air is detected for prescan module Not ok

No air is detected for prescan module

Ok

User interference: remove tube

Test air if detected after tube has been removed Not ok

No air is detected for prescan module

Ok

Test if in line voltage is present on MS-BOARD Not ok

No in line voltage was detected on MS-BOARD
1.5 Scanner - Checkpoint 5

Run Diagnostic Software:

7 DIAGNOSTICS

2 Mechanical Modules

6 Scanner

- Test connections of slow scan module
  - Start slowscan rollers with fast speed
    - Not ok - Starting slowscan rollers with fast speed failed
    - Ok
  - Stop slow scan rollers
    - Not ok - Stopping slowscan rollers failed
    - Ok
  - Test if stepper lightbarrier of motor M702 is clear
    - Not ok - Stepper lightbarrier of motor M702 is not clear
    - Ok
  - Move scanner motors to home position
    - Not ok - Moving scanner motors to home position failed
    - Ok
  - Test if X positioning lightbarrier of motor M203/M208 is clear
    - Not ok - Error xxxx occurred when testing if X positioning lightbarrier of motor M702 is clear
    - Ok

- Test connections of slow scan module
  - Start slowscan rollers with fast speed
    - Not ok - Starting slowscan rollers with fast speed failed
    - Ok
  - Stop slow scan rollers
    - Not ok - Stopping slowscan rollers failed
    - Ok
  - Test if stepper lightbarrier of motor M702 is clear
    - Not ok - Stepper lightbarrier of motor M702 is not clear
    - Ok
  - Move scanner motors to home position
    - Not ok - Moving scanner motors to home position failed
    - Ok
  - Test if X positioning lightbarrier of motor M203/M208 is clear
    - Not ok - Error xxxx occurred when testing if X positioning lightbarrier of motor M702 is clear
    - Ok
continues Scanner – Checkpoint 5

Test if X positioning lightbarrier of motor M203/M208 is interrupted

Timeout, when testing if X positioning lightbarrier of motor M702 is interrupted

1.6 Erasure Unit - Checkpoint 6

Run Diagnostic Software:

7 DIAGNOSTICS
3 Erasure Unit

The subprogram LAMPS is shown after the main program.

Test connections of erasure unit

Switch off erasure unit fan

Not ok → Switching off erasure unit fan failed

Ok

Switch on power unit fan

Not ok → Switching on power unit fan failed

Ok

Question in CLIPS: Does power unit fan run

Ok

Switch off power unit fan

Not ok → Switching off power unit fan failed

Ok

Switch on erasure unit fan

Not ok → Switching on erasure unit fan failed

Ok

Question in CLIPS: Does erasure unit fan run

Ok

Perform a complete safety test on the erasure unit

Not ok → Safety test of erasure unit failed

Ok

Test if erasure unit power is ok

Not ok → Erasure unit power is not ok

Ok
continues Erasure Unit – Checkpoint 6

Switch off erasure unit lamps

Get erasure unit lamp currents

Test lamps 1...10

Switching off erasure unit lamps failed

Getting erasure unit lamps currents failed

There is current detected while erasure unit lamps are switched off

Erasure unit fan speed is ok

Erasure control board is not ok

Current sense board is not ok

Test of transformer 1 failed

Test of transformer 2 failed

Test of transformer 3 failed

Test of transformer 4 failed

Test of transformer 5 failed

Erasure lamps are not connected correctly

Test of erasure unit fan speed failed
continues Erasure Unit – Checkpoint 6

Subprogram LAMPS:

- Switch on erasure unit lamps of trafo x
  - Ok
  - Not ok: Switching on erasure unit lamps of trafo x failed

- Get erasure unit lamps currents
  - Ok
  - Not ok: Getting erasure unit lamps currents failed

- Switch off erasure unit lamps
  - Ok
  - Not ok: Switching off erasure unit lamps failed

1.7 Postscan Transport Unit - Checkpoint 7

Run Diagnostic Software:

7 DIAGNOSTICS
2 Mechanical Modules
7 Postscan transport

The subprogram VACUUM is shown at Checkpoint 4.
continues Postscan Transport Unit – Checkpoint 7

1. Get rotation position
   - Rotation position is unknown
2. Test connections of rotation module
3. Test connections of cassette module x
   - Closing opener of cassette module x failed
4. Close opener of cassette module x
   - Ok
5. Test connections of cassette module x
6. Move up lift of cassette module x
   - Ok
7. Move home belt of cassette module x
   - Ok
8. Stop input rolls of cassette module x
   - Ok
9. Start input rolls of cassette module x
   - Ok
10. Stop input rolls of cassette module x
    - Ok
11. Move down lift of cassette module x
    - Ok
12. Open cassette of cassette module x
    - Ok

Timeout when testing if puls lightbarrier of subnode 2 of GS408 is clear
Error xxxx occurred when testing if puls lightbarrier of subnode 2 of GS408 is clear
Initialization of rotation module failed
Turning cassette module x to input failed

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The controlled version of this document resides on MedNet. Any printed copy of this document is uncontrolled.
continues Postscan Transport Unit – Checkpoint 7

Get rotation position
1 or 2

Test connections of cassette module x

Close opener of cassette module x
Ok

Unclamp clamper of cassette module x
Ok

Move up lift of cassette module x
Ok

Stop input rolls of cassette module x
Ok

Start input rolls of cassette module x
Ok

Stop input rolls of cassette module x
Ok

Move down lift of cassette module x
Ok

Unclamping cassette of cassette module x
Ok

Clamp cassette of cassette module x
Ok

Open cassette of cassette module x
Ok

VACUUM

Moving up postscan robot
Ok

Waiting for postscan robot to reach upper position
Ok

Lay down the suction cups on the IP
Ok
continues Postscan Transport Unit – Checkpoint 7

- Test if X positioning light barrier of motor M401 is clear
  - Ok
  - Not ok: Timeout when testing X if positioning light barrier of motor M401 is clear

- Wait for xxx seconds
  - Ok

- Test if vacuum is detected for postscan module
  - Ok
  - Not ok: No vacuum is detected for postscan module

- Switch off vacuum pump pre/postscan module
  - Ok
  - Not ok: Switching off vacuum pump pre/postscan module failed

- Set valve of pre/postscan module to vacuum pump
  - Ok
  - Not ok: Setting valve of pre/postscan module to vacuum pump failed

- Wait for xxx seconds

- Move suction drive back to stripp off the IP
  - Ok
  - Not ok: Moving suction drive back failed

- Move postscan robot down to interrupt suction X-POS light barrier
  - Ok
  - Not ok: Timeout when testing X if positioning light barrier of motor M400 is interrupted

- Test if X positioning light barrier of motor M400 is interrupted
  - Ok
  - Not ok: Error xxxx occurred when testing X positioning light barrier of motor M400 is interrupted

- Move down robot of postscan module
  - Ok
  - Not ok: Starting to move down robot of postscan module failed

- Waiting for robot of postscan module to finish the movement down
  - Ok
  - Not ok: Movement down of robot of postscan module failed

- Move robot of postscan module out to points
  - Ok
  - Not ok: Move robot of postscan module out to points failed

- Test if left points light barrier of postscan is open
  - Ok
  - Not ok: Left points light barrier of postscan module is closed

- Test if right points light barrier of postscan is open
  - Ok
  - Not ok: Right points light barrier of postscan module is closed
continues Postscan Transport Unit – Checkpoint 7

- Move postscan robot from points position to home position
  - Ok
  - Not ok

- Move suction cups and sled of postscan module home
  - Ok
  - Not ok

- Test connections of cassette module x
  - Ok

- Close opener of cassette module x
  - Not ok

- Unclamp clamper of cassette module x
  - Ok
  - Not ok

- Move up lift of cassette module x
  - Ok
  - Not ok

- Test connections of cassette module x
  - Ok

- Move belt of cassette module x to end position
  - Not ok

- Move belt of cassette module x to home position
  - Ok
  - Not ok
Purpose of this document
This document describes electrical and mechanical codes, fuses and LEDs of the digitizer.

Document History

<table>
<thead>
<tr>
<th>Edition Revision</th>
<th>Release Date</th>
<th>Changes compared to previous version 1.0</th>
</tr>
</thead>
<tbody>
<tr>
<td>2.0</td>
<td>02-2007</td>
<td>Only layout changes as this Service Documentation is also valid for CR 75.0 Type 5146/105 (as of SN ≥ 6000).</td>
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Referenced Documents

<table>
<thead>
<tr>
<th>Document</th>
<th>Title</th>
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<tbody>
<tr>
<td>Service Bulletin</td>
<td>CR 75.0 Type 5146/105 (as of SN ≥ 6000) introduced, DD+DIS028.07E</td>
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WARNING:
Improper operation or service activities may cause damage or injuries.

INSTRUCTION:
(1) Read the "Generic Safety Directions" document (see MEDNET GSO => General Info => Agfa HealthCare => Publications => Service Manual) prior to attempting any operation, repair or maintenance task on the equipment.

(2) Strictly observe all safety directions within the "Generic Safety Directions" and on the product.
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CM+9 9499 8120 3

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<th>Switch</th>
<th>Settings</th>
<th>Circuit Diagram Page /Coord</th>
</tr>
</thead>
<tbody>
<tr>
<td>210</td>
<td>Cassette module 1</td>
<td>JL1</td>
<td><img src="JL1.png" alt="Switch JL1" /></td>
<td>2/B4-E5</td>
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<td>JL2</td>
<td><img src="JL2.png" alt="Switch JL2" /></td>
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<td>Cassette module 2</td>
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<td>JL2</td>
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<tr>
<td>610</td>
<td>5fold-St-Scan Board</td>
<td>JL1</td>
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<td>6/D3-H3</td>
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<td>JL2</td>
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# GS IOB-SIN-Step Boards

CM+9 9499 8140 4

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<th>Settings</th>
<th>Circuit Diagram Page /Coord</th>
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<td>Rotation Board</td>
<td>JL1</td>
<td></td>
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<tr>
<td>412</td>
<td>Postsc-Suct Board</td>
<td>JL1</td>
<td></td>
<td>4/C2-D2</td>
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<tr>
<td>418</td>
<td>Post-Sled Board</td>
<td>JL1</td>
<td></td>
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<tr>
<td>428</td>
<td>Pre-Suction Board</td>
<td>JL1</td>
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<td>4/G2-H2</td>
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<tr>
<td>434</td>
<td>Prescan-Sled Board</td>
<td>JL1</td>
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<td>4/G1-H2</td>
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<tr>
<td>510</td>
<td>Inbuff-Belt Board</td>
<td>JL1</td>
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<tr>
<td>532</td>
<td>Inbuff-Door Board</td>
<td>JL1</td>
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<td>5/G4-G5</td>
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<tr>
<td>552</td>
<td>Outbuff-Push Board</td>
<td>JL1</td>
<td></td>
<td>5/G4-G5</td>
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<tr>
<td>556</td>
<td>Outbuff-Roll Board</td>
<td>JL1</td>
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<td>5/B4-C5</td>
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</table>
2 Fuses Overview

NOTE:
All fuses are slow bow fuses.

<table>
<thead>
<tr>
<th>Board</th>
<th>Fuse</th>
<th>Quality</th>
<th>Protects</th>
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<tbody>
<tr>
<td>GS100 MS-Board</td>
<td>SI 1</td>
<td>T 2.5A</td>
<td>GS210, 5 fold stepper motor board cass unit 1</td>
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<tr>
<td></td>
<td>SI 2</td>
<td>T 2.5A</td>
<td>GS260, 5 fold stepper motor board cass unit 2</td>
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<td></td>
<td>SI 3</td>
<td>T 2.5A</td>
<td>GS610, 5 fold stepper motor board scan unit</td>
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<td></td>
<td>SI 4</td>
<td>T 1A</td>
<td>GS510 Input Buffer Belt board</td>
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<td></td>
<td>SI 5</td>
<td>T 1A</td>
<td>GS532 Input Buffer Door board</td>
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<tr>
<td></td>
<td>SI 6</td>
<td>T 1A</td>
<td>GS556 Output Buffer Roller board</td>
</tr>
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<td></td>
<td>SI 7</td>
<td>T 1A</td>
<td>GS552 Output Buffer Push board</td>
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<td></td>
<td>SI 8</td>
<td>T 1A</td>
<td>GS202 Rotation board</td>
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<td>SI 9</td>
<td>T 1A</td>
<td>GS418 Postscan Sled board</td>
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<td></td>
<td>SI 10</td>
<td>T 1A</td>
<td>GS412 Postscan Suction board</td>
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<td>SI 11</td>
<td>T 2.5A*</td>
<td>GS434 Prescan Sled board</td>
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<td></td>
<td>SI 12</td>
<td>T 1A</td>
<td>GS428 Prescan Suction board</td>
</tr>
<tr>
<td></td>
<td>SI 13</td>
<td>T 2.5A</td>
<td>+24 V devices</td>
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* Fuse quality was changed from T 1A to T 2.5A because of too high current load.
Purpose of this document
This document describes replacements and repair procedures for the digitizer.

Document History

<table>
<thead>
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<th>Edition</th>
<th>Revision</th>
<th>Release Date</th>
<th>Changes compared to previous version 2.0</th>
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<td>09-2008</td>
<td></td>
<td>• Chapter 7 adapted (serial numbers added).</td>
</tr>
<tr>
<td></td>
<td></td>
<td></td>
<td>• Chapter 8 added (Revive Board).</td>
</tr>
<tr>
<td></td>
<td></td>
<td></td>
<td>• Updated structure of the document: Added required</td>
</tr>
<tr>
<td></td>
<td></td>
<td></td>
<td>spare parts, required tools, required times, removal, re-install.</td>
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</tbody>
</table>

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NOTE:
To verify the latest version of single documents and of Service Manuals refer to the Document Type ‘Order List’ in the GSO library.
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1 Safety Note

WARNING:
Risk of electric shock!
Switch off the digitizer before performing any service interventions at the digitizer.

2 Replacements at the Erasure Unit

2.1 Removing the Erasure Unit

Required spare parts:
Spare part number*: Halogen Lamp CM+9 0450 6582 0
* The last digit in the spare part number indicates the spare part revision at release of this document. When ordering, the actual revision of the spare part is delivered.

Required tools:
N.a.

Required time:
Approximately 15 min

Removal:

1) Press down the clamping plate on top of the erasure unit.
(2) Pull out the erasure unit to the stop.

(3) Take the erasure unit with one hand and press down the other clamping plate on the top with the other hand and pull it out.

(4) Lay down the unit on a safe and stable place.

NOTE:
The glass bulbs of the new lamps must be clean. Use a soft cloth; do not touch with bare fingers.

(5) Open the two latches beside the glass.
(6) Swing up the glass covering of the lamps.

(7) Pull the lamps which need to be replaced carefully out of the sockets.

(8) Insert the new lamps carefully in the sockets and push them to stop position.

Re-installation:

(1) Follow the steps in reverse order.

(2) Take care that the clamping plate locks into place by moving the erasure unit back into the digitizer.

Verification: Start the digitizer. The self test should be successful.

Result Lamps of the erasure unit replaced and operative.
3 Replacement of the Erasure Unit Fan

Required spare parts:
Spare parts order number*: Erasure Unit Fan CM+9 5146 3620 0
* The last digit in the spare part number indicates the spare part revision at release of this document. When ordering, the actual revision of the spare part is delivered.

Required tools:
Socket wrench 7 mm

Required time:
Approximately 10 minutes

Removal:
(1) Unscrew the three screws (marked with white circles with a socket wrench (7mm).

IMPORTANT:
Do not try to unscrew the screw in the left upper position (see arrow in figure 6)! It is secured by lacquer.
(2) Take out the fan carefully and unplug the cable.

Re-installation:

(1) Plug the cable of the new fan in the erasure fan unit (see figure 7).

(2) Insert the fan.

(3) Fasten the three screws (marked with white circles with a socket wrench 7mm (see figure 6).

Verification: Start the digitizer. The self test should be successful.

Result Fan of the erasure unit replaced.
4 Replacements at the Transport Units

4.1 Replacing the Vacuum Pump

NOTE:
For replacing the vacuum pump of the IP transport unit – postscan, it is necessary to take the complete frame out of the digitizer.

Required spare parts:
- Pump plate spare part number*: CM+9 5146 6230 3
- Only for sites, which are located between 2000 m and 4000 m above sea level: High Altitude Vacuum Pump spare part number*: CM+9 5148 6230 0 (for more information see DD+DIS278.07E, Service Bulletin No.04 of CR 85-X)

* The last digit in the spare part number indicates the spare part revision at release of this document. When ordering, the actual revision of the spare part is delivered.

Required tools:
Socket wrench (5.5 mm)

Required time:
Approximately 20 minutes

Removal:
(1) Open the white plastic clamp.

figure 8
(2) Unplug the black plug.

(3) Pull off the vacuum hose.
(4) Unscrew the three mounting screws (see circles).
(5) Remove the vacuum unit.

(6) Remove the dust cover (see arrows) on the High Altitude Vacuum Pump.

Re-installation:
(1) Follow the steps of Removal in reverse order.

Verification: Start the digitizer. The self test should be successful.

Result Vacuum pump replaced.
4.2 Replacing the Transport Units (Pre- and Postscan)

Required spare parts:
- Frame output spare part number*: CM+9 5148 6600 1
- Frame input spare part number*: CM+9 5146 6300 0

* The last digit in the spare part number indicates the spare part revision at release of this document. When ordering, the actual revision of the spare part is delivered.

Required tools:
N.a.

Required time:
Approximately 10 minutes.

Removal:
(1) Unplug both plugs.

NOTE:
By repositioning the transport unit take care of the guiding bar on the bottom of the digitizer.
(2) Pull out the transport unit.

**Re-installation:**

1. Push the transport unit in the digitizer.
2. Plug in the 2 plugs.

**Verification:**

Start the digitizer. The self test should be successful.

**Result**

Transport unit replaced.
4.3 Replacing the Stepper Motor Boards of the Robot

Required spare parts:
PCB IOB-SIN-STEP spare part number*: CM+9 9499 8140 6
* The last digit in the spare part number indicates the spare part revision at release of this document. When ordering, the actual revision of the spare part is delivered.

Required tools:
Socket wrench 5,5 mm

Required time:
Approximately 20 minutes.

Removal:
(1) Remove the IP-transport unit from the machine.
(2) Move the robot manually to the top of the frame.
(3) Unscrew the covering plate with a socket wrench (5,5mm).

figure 16
(4) Swing up the covering plate.

(5) Unplug the cables of the board.

(6) Press the black plastic clamp carefully and lift the board off the four pins. Remove the board.

Re-installation:
(1) Follow the steps of Removal in reverse order.

Verification: Start the digitizer. The self test should be successful.

Result: Stepper motor board of the robot replaced.
5 Replacements at the Scan Unit

5.1 Safety Note

CAUTION:
Risk of injury when removing the scan unit!
To remove the scan unit safely, use the digitizer ramp. Check that both adjustable feet are touching the ground before removal of the scan unit.

5.2 Sliding out the Scan Unit

Required spare parts:
N.a.

Required tools:
Screwdriver

Required time:
Approximately 5 minutes

Removal:
1. Unlock the scan unit by loosening two screws (1) - only half a turn.
2. Pull out the scan unit to its stop.

figure 19
Re-installation:
(1) Push the scan unit until it stops.
(2) Fasten the two screws (see figure 20).

Verification: Start the digitizer. The self test should be successful.

Result: Scan unit is ready for operation.

5.3 Replacing the 5fold Stepper Motor Board at the Scan Unit

Required spare parts:
PCB IOB SIN 5Step spare part number*: CM+ 9 9499 8130 0

* The last digit in the spare part number indicates the spare part revision at release of this document.
When ordering, the actual revision of the spare part is delivered.

Required tools:
N.a.

Required time:
Approximately 15 minutes

Removal:
Slide out the scan unit as described in section 5.2, page 18.

NOTE:
Wear a grounding strap (spare part number*: CM+9 9999 0830 0) when touching the stepper motor board.

* The last digit in the spare part number indicates the spare part revision at release of this document.
When ordering, the actual revision of the spare part is delivered.
(3) Press the plastic clips of the black covering plate a little inside and take away the covering.

(4) Unplug all cables at the stepper motor board and lift it off the studs.

Re-installation:
(1) Follow the steps of Removal in reverse order.

Verification: Start the digitizer. The self test should be successful.

Result 5fold Stepper Motor Board replaced.
5.4 Replacing the Optic Module

5.4.1 Safety Note

**WARNING:**
Risk of electric shock!
Make sure that the digitizer is switched off, before you remove the optic module.

**IMPORTANT:**
There are no serviceable parts inside the optic module.
Do not open sealed parts of the module.

5.4.2 Removing the optic module

**CAUTION:**
Risk of injury when removing the scan unit!
To remove the scan unit safely, use the digitizer ramp. Check that both adjustable feet are touching the ground before removal of the scan unit.

**Required spare parts:**
Lens Assembly spare part number*: CM+9 5148 2700 2

* The last digit in the spare part number indicates the spare part revision at release of this document. When ordering, the actual revision of the spare part is delivered.

**Required tools:**
- Socked wrench 5,5 mm
- Allen key 4 mm

**Required time:**
Approximately 30 minutes
Removal:

(1) Unlock the scan unit by loosening two screws 1 - only half a turn.

(2) Pull out the scan unit to its stop.

(3) Undo the shielding clamp A with a 5.5 mm socket wrench. Unplug the polygon plug B (the connection is unmistakable).

(4) Unplug activation plug of the optic module (Sub-D plug, 25 pins).

NOTE:
Locking clips prevent the plug from working loose.
(5) Press the plastic clips of the black covering plate a little inside and take away the covering.

(6) Loosen quick action closure 1 and snap lock 2 of the holder of the 5fold stepper motor board.

(7) Unplug all connections at the 5 fold stepper motor board.

(8) Turn up the holder to its stop.
(9) Undo four Allen screws of the optic module (4 mm Allen key).

(10) Unscrew the handles from the platform and fit it to the provided bore holes. Lift up the optic module cautiously by using the two handles and remove it from the scan unit.

Re-installation:

(1) Insert the new optic module by using the two handles: make sure that both centering pins (1-2) have engaged.

(2) Tighten four Allen screws of the optic module.

(3) Re-connect all cables.

(4) Turn down the 5fold stepper motor board and mount cover.

(5) An IP center calibration and a shading calibration must be done after the installation (see chapter 3.6).
5.4.3 Putting the new optic module in operation

(1) Switch on the Digitizer.

(2) Install the optics specific data from the enclosed floppy disk via the Service Menu at the user terminal.

NOTE:
In case that a digitizer with new cPCI-Rack and USB is used (CR 85-X SN ≥ 4000; CR 75.0 SN ≥ 6500), copy the floppy disk to a USB memory stick.

(3) Select
<5 INSTALL data>*
<4 Optics parameters>.

(4) The system requests:
- to compare the S/N on the optic module and the S/N stored on the floppy disk.
  After confirmation the parameters are loaded.
  The serial number of the exchange part is automatically entered in the info counter file under "HW Replacement history" together with date and counter stamp.
- to update the backup

(5) Make an IP center calibration, see chapter 3.6.

(6) Make a shading calibration of all formats, see chapter 3.6.

(7) Update the backup to save the calibration data.

(8) Select
<3 SAVE data>*
<2 Machine specific data>.

(9) Follow the on-line instructions.

(10) Enter the serial number of the Digitizer on the label of the optic module floppy disk.

(11) Check the image quality with flatfield exposures (if available, also with test sheet), see chapter 3.6.

Verification: Start the digitizer. The self test should be successful.

Result: Optic module replaced.

* Labelling of menu entries depends on the software version of the digitizer. In software versions older than ACP_5007 the term "data" is called "floppy".
5.5 **Replacing the Photomultiplier Module (PMM)**

⚠️ **CAUTION:**

*Risk of injury when removing the scan unit!*

To remove the scan unit safely, use the digitizer ramp. Check that both adjustable feet are touching the ground before removal of the scan unit.

Required spare parts:

Photomultiplier Module (PMM) with Light Collector (Acrylic light guide assembly)

spare part number*: CM+9 5148 2280 6

* The last digit in the spare part number indicates the spare part revision at release of this document. When ordering, the actual revision of the spare part is delivered.

Required tools:

- Allen key 2,5 mm
- Allen key 7 mm
- Screwdriver

Required time:

Approximately 30 minutes

5.5.1 **Removing Components of the Scan Unit**

Removal:

1. Unlock the scan unit by loosening two screws (1) - only half a turn.

2. Pull out the scan unit to its stop.

---

Document Control Note:

The controlled version of this document resides on MedNet. Any printed copy of this document is uncontrolled.
(3) Remove the cover of the 5fold Stepper Motor Board and turn it up till its stop.

(4) Undo the four fastening screws (1-4) of the optic module with a 4 mm Allen key.
(5) Lift up the optic module cautiously and remove it from the scan unit.

(6) Undo the Allen screw at the light well (close to the gear box, 3mm Allen key)

(7) Lift up the light well.
5.5.2 Removing the Photomultiplier Module (PMM) with Light Collector

**CAUTION:**

Risk of damage!
Photomultiplier and light collector are glued and must be treated as one component.

Removal:

1. Loosen the four Allen screws at the corners of the photomultiplier (1-4) with a 2.5 mm Allen key.

2. Loosen the four Allen screws at the light collector (7mm Allen key).

![figure 36](5148_Chap3.5_060.cdr)

![figure 37](5148_Chap3.5_063.cdr)
(3) Remove retaining ring of the dust brush.

(4) Draw the dust brush to its outermost position (to avoid bending of the brush).

(5) Thread the cabling of the brush through the guidance.
(6) Pull out the PMM with the right side ahead.
Take the module with both hands on top of the light collector (left and right from the photomultiplier).

(7) Put down the PMM carefully.
5.5.3 Installing the new Photomultiplier Module (PMM) with Light Collector

Re-installation:

(1) Install the new PMM, put in with left side ahead.

(2) Thread the cabling of the brush through the guidance.
(3) Draw the dust brush to its outermost position (to avoid bending of the brush).

(4) Put retaining ring of the dust brush back in place.
(5) Tighten the four Allen screws at the corners of the photomultiplier (2.5 mm Allen key).

(6) Tighten the four Allen screws at the light collector (7 mm Allen key).

(7) Return the dust brush to its park position.

(8) Re-install the light-well and the optic module in reverse order as described above.

(9) Turn down the 5fold Stepper Motor Board.

(10) Push scan unit back into the digitizer and tighten the fastening screws.

(11) Close doors.

(12) Continue with 5.5.4.
5.5.4 Putting the new Photomultiplier in Operation

(1) Switch on the Digitizer.

(2) Install the mfa / mfb parameters from the enclosed floppy disk via the Service Menu at the user terminal.

NOTE:

In case that a digitizer with new cPCI-Rack and USB is used (CR 85-X SN ≥ 4000; CR 75.0 SN ≥ 6500), copy the floppy disk to a USB memory stick.

(3) Select
   <5 INSTALL data>*
   <3 PMT settings (mfa/mfb) >.

   The system requests:
   - to compare the serial number on the photomultiplier module and the serial number stored on the floppy disk. After confirmation the parameters are loaded. The serial number of the exchange part is automatically entered in the info counter file under "HW Replacement history" together with date and counter stamp.
   - to update the backup

(4) Calibrate all formats, see chapter 3.6.

(5) Update the backup to save the calibration data.

(6) Select
   <3 SAVE data>*
   <2 Machine specific data >.

(7) Follow the on-line instructions.

(8) Enter the serial number of the Digitizer on the label of the photomultiplier floppy disk.

(9) Check the image quality with flatfield exposures (if available, also with test sheet), see chapter 3.6.

**Verification:** Start the digitizer. The self test should be successful.

**Result:** Photomultiplier Module (PMM) with Light Collector replaced.

* Labelling of menu entries depends on the software version of the digitizer. In software versions older than ACP_5007 the term "data" is called "floppy".
5.6 Removing the Scan Unit completely from the Digitizer

5.6.1 Sliding the Scan Unit onto the Ramp

CAUTION:
Risk of injury when removing the scan unit!
To remove the scan unit safely, use the digitizer ramp. Check that both adjustable feet are touching the ground before removal of the scan unit.

In order to remove the scan unit safely, always wear safety shoes with steel toe cap.

Required spare parts:
- n.a.

Required tools:
- Allen key 3 mm

Required time:
- Approximately 20 minutes
Removal:

1. Unlock the scan-unit by removing the locking device (3 mm Allen key).
2. Remove the ramp of the scan unit; it is hidden behind the left side panel.
3. Hook the ramp into the gaps between the two feet of the digitizer.
4. Let the scan unit slide onto the ramp.
### 5.6.2 Removing the Energy Chain

1. Open all cable clamps.
2. Remove screw 1.
3. Remove energy chain with metal plate 2.
4. Press the plastic clips of the black covering plate a little inside and take away the covering.
(5) Unplug connectors (1-4).
(6) Take all cables out of the clamps.

(7) Let the scan unit slide smoothly to the floor.
5.7 Removing modules from a defective Slow Scan Unit

To replace a complete slow scan unit, first remove the following modules from the defective slow scan unit as described before:

- 5fold stepper motor board at Scan Unit (see 5.3),
- Optic Module (see 5.4.2),
- The light-well-module (see 0),
- Photomultiplier Module (PMM) with light collector and dust brush (see 5.5.2).

5.7.1 Installing a new Slow Scan Unit

Required spare parts:

Slow scan unit spare part number*: CM+9 5148 2220 2

* The last digit in the spare part number indicates the spare part revision at release of this document. When ordering, the actual revision of the spare part is delivered.

Required tools:

n.a.

Required time:

Approximately 20 minutes (excluding tasks named in 5.7)

Re-installation:

1. Unpack the new scan unit as described in the enclosed Installation Instructions.
2. For sending back the old scan unit use the packing of the new one and follow the unpacking instructions in reverse order.

NOTE:

Mind to fill out the Defect Label in a correct and detailed way for the old scan module!
(3) Install the new scan unit (see delivery condition in figure beside)

(4) Re-install
   - the PMM with light collector and dust-brush,
   - the light-well
   - the optic module
   - and the 5fold stepper motor board in reverse order as described above.

(5) Slide back the scan unit onto the ramp and into the digitizer.

(6) Remove the ramp.

(7) Install, the energy chain and plug in all plugs at the scan unit

(8) An IP center calibration and a shading calibration must be done after installation (see chapter 3.6 of service documentation).

(9) Continue with 5.7.2.
5.7.2 Putting the new Slow Scan Unit in Operation

(1) Switch on the Digitizer.

(2) Install the mfa / mfb parameters from the enclosed floppy disk via the Service Menu at the user terminal.

**NOTE:**
In case that a digitizer with new cPCI-Rack and USB is used (CR 85-X SN ≥ 4000; CR 75.0 SN ≥ 6500), copy the floppy disk to a USB memory stick.

(3) Select

```
<5 INSTALL data>*
<3 PMT settings (mfa/mfb)>
```

The system requests:
- to compare the serial number on the photomultiplier module and the serial number stored on the floppy disk. After confirmation the parameters are loaded.

The serial number of the exchange part is automatically entered in the info counter file under "HW Replacement history" together with date and counter stamp.

- to update the backup

(4) Install the optics specific data from the enclosed floppy disk via the Service Menu at the user terminal.

(5) Select

```
<5 INSTALL data>*
<4 Optics parameters>
```

The system requests:
- to compare the S/N on the optic module and the S/N stored on the floppy disk.

After confirmation the parameters are loaded.

The serial number of the exchange part is automatically entered in the info counter file under "HW Replacement history" together with date and counter stamp.

- to update the backup

(6) Install the scanner parameters from the enclosed floppy disk via the Service Menu at the user terminal.
(7) Select

<5 INSTALL data>*
<5 Scanner parameters>

The system requests:
- to compare the serial number on the photomultiplier module and the serial number stored on the floppy disk. After confirmation the parameters are loaded. The serial number of the exchange part is automatically entered in the info counter file under "HW Replacement history" together with date and counter stamp.
- to update the backup

(8) Calibrate all formats, see chapter 3.6.

(9) Update the backup to save the calibration data.

(10) Select

<3 SAVE data>*
<2 Machine specific data>

(11) Follow the on-line instructions.

(12) Enter the serial number of the Digitizer on the label of the photomultiplier floppy disk.

(13) Check the image quality with flatfield exposures (if available, also with test sheet), see chapter 3.6.

**Verification:** Start the digitizer. The self test should be successful.

**Result**

Slow scan unit replaced.

* Labelling of menu entries depends on the software version of the digitizer. In software versions older than ACP_5007 the term "data" is called "floppy".
6 Replacement of the Cassette Unit

6.1 Preparations

Required spare parts:
- Cassette Unit 1 spare part number*: CM+9 5146 5100 1
- Cassette Unit 2 spare part number*: CM+9 5146 5400 1

* The last digit in the spare part number indicates the spare part revision at release of this document. When ordering, the actual revision of the spare part is delivered.

Required tools:
Socket wrench 7 mm

Required time:
Approximately 30 minutes

Removal:
(1) Open the doors of the Digitizer.
(2) Turn cassette unit by 180° and loosen two grounding cables (1) (7 mm socket wrench).

(3) Turn cassette unit by 180° again.

(4) Open quick action closure (2).
6.2 Removing Cassette Module 2 from the Digitizer

(1) Pull cassette module 2 cautiously out of the machine (3).

(2) Unplug data cable (6).
(3) Unclip cable supports (4).
(4) Unplug power supply cable (5).
(5) Lift cassette module 2 cautiously until it disengages from the hinges (7).

(6) Put cassette module 2 aside. Mind a solid stand of the module.
6.3 Removing Cassette Module 1 from the Digitizer

(1) Turn cassette module 1 by 90°.

(2) Unplug power supply cable at the top of the module (8).

(3) Unplug data cable (9).

(4) Loosen two screws (10) at the mounting of the energy chain (11) (7 mm socket wrench).

---

figure 60

figure 61

figure 62
NOTE:
Take care that the screws cannot fall into the digitizer.

(5) Push the mount of the energy chain upwards (11) until the pins have left the holes (12).

(6) Lift and cant cassette module 1 a little until the bolts of the rotation unit are free (13).

(7) Put cassette module 1 aside. Mind a solid stand of the module.

6.4 Re-installing the Cassette Unit

Re-installation:
(1) Re-install the cassette unit in reverse order as described in 6.1 - 6.3.

Verification: Start the digitizer. The self test should be successful.
Result: Cassette unit replaced.
7 cPCI-Rack (up to CR 85-X SN < 4000; CR 75.0 SN < 6500)

7.1 Replacing a defective Hard Disk (HDD)

7.1.1 Removal of the old Hard Disk

**WARNING:**

*Risk of electric shock!*

Switch off the digitizer and disconnect the machine from the mains.
Safety instructions for electronical parts see Chapter 3.1 and Generic Safety Directions for HealthCare and Imaging Products.

Required spare parts:

Hard disk spare part number*: CM+9 0486 1354 0

* The last digit in the spare part number indicates the spare part revision at release of this document. When ordering, the actual revision of the spare part is delivered.

Required tools:

Screwdriver

Required time:

Approximately 30 minutes (including Software installation)

**NOTE:**

In order to avoid any damage at the storage board, replace the HDD very cautiously.

**NOTE:**

Always use the Antistatic wrist strap when working inside the digitizer.
Removal:

(1) Open the front doors. The cPCI-rack with the storage board (1) is placed in the frame of the left door.

![figure 65]

(2) Remove the storage board by loosen the four Phillips screws (black circles).

![figure 66]

NOTE:
These are captive screws. They cannot be removed completely.
(3) Pull out the storage board cautiously.

(4) Disconnect the electric connections:

(5) Loosen the two terminal rails (3).

(6) Disconnect the ribbon cables (4) and 5 from floppy disk drive (7) and hard disk 6.

(7) Disconnect the connector (2) of the 5 V power supply.

figure 67

figure 68

1 Storage board
2 Connector
3 Terminal rail
4 Ribbon cable for hard disk
5 Ribbon cable for floppy disk
6 Hard disk
7 Floppy disk drive
8 Connector
(8) Figure 69 shows the storage board with inserted hard disk.

(9) Loosen four round-head screws at the rear of the storage board (black circle) to separate the hard disk from storage board.

NOTE:
Hold the hard disk firmly in one hand (see figure 70), while you remove the four round-head screws with a mid-size screw driver.
7.1.2 Installation of the new Hard Disk

Re-installation:

(1) To install the new hard disk follow the instructions in reverse order.

Result

Hard disk replaced. Continue with installing the software.

NOTE:

For installation instructions of the software on a virgin hard disk refer to the enclosure delivered with the software. The software can be downloaded from:
MEDNET GSO => Computed Radiography => CR Digitizer => CR 85-X => Freeware => CR 85-X - Software - Device Software - ACP_5007
8 New cPCI-Rack (as of CR 85-X SN ≥ 4000; CR 75.0 SN ≥ 6500)

8.1 Replacing a defective Hard Disk (HDD)

**WARNING:**

Risk of electric shock!

Switch off the digitizer and disconnect the machine from the mains. Safety instructions for electronical parts see Chapter 3.1 and Generic Safety Directions for HealthCare and Imaging Products.

**Required spare parts:**

- Hard disk spare part number*: CM+ 9 0486 1428 0
- Cable set spare part number*: CM+ 9 5148 1490 0

* The last digit in the spare part number indicates the spare part revision at release of this document. When ordering, the actual revision of the spare part is delivered.

**Required tools:**

Screwdriver

**Required time:**

Approximately 20 minutes (including installation)

**NOTE:**

- In order to avoid any damage at the storage board, replace the HDD very cautiously.
- Always use the Antistatic wrist strap when working inside the digitizer.
Removal:

(1) Open the front doors of the digitizer. The cPCI-rack with the storage board (A) is placed in the frame of the left door.

(2) Unplug the 8 cables.
(3) Loose the 4 Allen screws (see circles).

NOTE:
It is sufficient to loosen the Allen screws. It is not necessary to remove them completely.
(4) Pull out the revive board cautiously.

(5) Disconnect the 2 cables (power and IDE cable, see circles in figure 74).

NOTE:
Do not pull the cable itself. Always pull the plug.

(6) Loose the 4 screws (see circles in figure 75).

(7) Pull the defective hard disk carefully out of the rack.

NOTE:
Pull the hard disk in opposite direction of the board connections. Be careful with the cables, they should not get stuck on the revive board.

(8) Disconnect the Power- and the IDE-cable (see circles in figure 76) from the defective hard disk.

Re-installation:

(1) Connect the Power and the IDE-cable at the ordered hard disk.

(2) Insert the new hard disk into the rack.

NOTE:
Push it in opposite direction of the board connections. Be careful with the cables, they should not get stuck on the revive board.

(3) Connect power and IDE cables of the hard disk with the rack (see figure 74).
(4) Fix the hard disk by fasten the 4 screws (figure 75).

(5) Plug the revive board into the rack of the digitizer.

(6) Fasten the 4 screws of the rack (figure 73).

(7) Connect the 8 connectors into the particular sockets.

(8) Close the front doors of the digitizer.

(9) Install the latest digitizer software.

NOTE:

For installation instructions of the software on a virgin hard disk refer to the enclosure delivered with the software. The software can be downloaded from:
MEDNET GSO => Computed Radiography => CR Digitizer => CR 85-X => Freeware

Software version must be at least ACP_5007 to support the new cPCI-hardware.
8.2 Replacing the fan

Required spare parts:
Fan spare part number*: CM+ 9 5148 1425 0

* The last digit in the spare part number indicates the spare part revision at release of this document. When ordering, the actual revision of the spare part is delivered.

Required tools:
- Screwdriver

Required time:
- Approximately 10 minutes

Removal:
(1) Open the front doors. The new cPCI-rack with the storage board (A) is placed in the frame of the left door. The fan is placed on top of the new cPCI-rack.

![figure 77]

A
(2) Disconnect the power cable of the fan by pressing the connector (B) together.

(3) Loose the 2 screws of the bracket (C). The screws must not be removed completely.

(4) Take the bracket with fan out of the digitizer.

(5) Loose the 3 screws (D) on top of the fan.

Re-installation:

(1) Replace the defect fan with ordered fan.

(2) Fasten the 3 screws on top of the fan to fix the fan to the bracket.

(3) Remount the bracket into the digitizer.

(4) Fasten the 2 screws of the bracket.

(5) Connect the power cable.

(6) Close the front doors.

Verification: Switch on the digitizer. The fan must rotate easily.

Result: Fan of the Revive Rack replaced.
8.3 Replacing the Revive Board

Required spare parts:

Revive board spare part number*: CM+9 5148 9020 0

* The last digit in the spare part number indicates the spare part revision at release of this document. When ordering, the actual revision of the spare part is delivered.

Required tools:

Screwdriver

Required time:

Approximately 15 minutes

Removal:

(1) Remove the revive board like described in 8.1.
(2) Remove the hard disk from the defective revive board.

Re-installation:

(1) Install the hard disk into the new revive board (according to 8.1).
(2) Remount the revive board like described in 8.1.

NOTE:
The replacement of the revive board does not require a new installation of the digitizer software.

Verification: Switch digitizer on and wait for successful self test.
Result: Revive Board replaced.
8.4 Replacing the power supply

Required spare parts*:
Power supply spare part number*: CM+9 5146 1430 2
* The last digit in the spare part number indicates the spare part revision at release of this document. When ordering, the actual revision of the spare part is delivered.

Required tools:
Screwdriver

Required time:
Approximately 15 min.

Removal:
(1) Open the front doors. The power supply (A) with the storage board is placed in the frame of the left door.
(2) Loose the 4 allen screws (see circles in figure 79).
Pull out the power supply cautiously.

NOTE:
The 4 Allen screws coming with the spare part power supply can be used, but are only alternative screws.

Re-installation:
(1) Remount the new power supply.
(2) Fasten the 4 screws.
(3) Close the front doors of the digitizer.

Verification: Switch on the digitizer. Self test must be performed successfully.
Result: Power supply replaced.
8.5 Replacing the new cPCI-rack

Required spare parts:
Revive Rack spare part number*: CM+9 5148 9010 0

* The last digit in the spare part number indicates the spare part revision at release of this document. When ordering, the actual revision of the spare part is delivered.

Required tools:
Screwdriver

Required time:
Approximately 15 min.

Removal:
(1) Open the front doors. The cPCI-rack is placed in the frame of the left door.
(2) Disconnect any cable of the revive board.
(3) Remove revive board, fan and power supply as described in 8.1, 8.2 and 8.4.
(4) Loose the 6 screws (A) of the rack.
(5) Take the rack carefully out of the digitizer.
(6) Disconnect the cable on the right external side of the rack (B).

![figure 81]
Re-installation:

1. Connect the grey cable to the external right side of the new rack (see figure 81).
2. Mount the new cPCI-rack.
3. Fasten the 6 screws of the rack.
4. Remount revive board, Power Supply and fan as described in 8.1, 8.2 and 8.4.
5. Connect any connectors to the sockets.
6. Close the front doors of the digitizer.

Verification: Switch on the digitizer. Self test must be performed successfully.

Result: Revive Rack replaced.
Purpose of this document
This document describes adjustments and calibration procedures for the digitizer.

Document History

<table>
<thead>
<tr>
<th>Edition. Revision</th>
<th>Release Date</th>
<th>Changes compared to previous version 2.0</th>
</tr>
</thead>
<tbody>
<tr>
<td>2.1</td>
<td>09-2008</td>
<td>• Updated calibration procedure. Details see section 3.</td>
</tr>
<tr>
<td></td>
<td></td>
<td>• Added calibration with mammography X-ray source. Details see sections 3.2 and 3.3.</td>
</tr>
</tbody>
</table>

Referenced Documents

<table>
<thead>
<tr>
<th>Document</th>
<th>Title</th>
</tr>
</thead>
<tbody>
<tr>
<td>DD+DIS174.08E</td>
<td>CR 85-X Service Bulletin # 06: “Announcement of Digitizer Software ACP_5007”</td>
</tr>
</tbody>
</table>
WARNING:
Improper operation or service activities may cause damage or injuries.

INSTRUCTION:
1) Read the "Generic Safety Directions" document (see MEDNET GSO => General Info => Agfa HealthCare => Publications => Service Manual) prior to attempting any operation, repair or maintenance task on the equipment.
2) Strictly observe all safety directions within the "Generic Safety Directions" and on the product.

NOTE:
To verify the latest version of single documents and of Service Manuals refer to the Document Type 'Order List' in the GSO library.
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CR 75.0 Type 5146/105 (as of SN ≥ 6000) Agfa Company Confidential
1 Overview of possible Adjustments

**Adjustments**
- see section 2
  - Rotation Unit
    - see 2.1
  - Guiding Plate
    - see 2.2
  - Suction Cups
    - see 2.3
  - Adjustment Cycle
    - see 2.4

**Calibrations**
- see section 3
  - Possible Reasons for a Calibration
    - see 3.1
  - IP Center Calibration
    - see 3.2
  - Shading Calibration
    - see 3.3

*figure 1*
2 Mechanical Adjustments

2.1 Adjustment of Rotation Unit

REQUIRED TIME:
Approximately 30 min.

2.1.1 General

For orientation the two modules of the Cassette Unit are marked with stickers "Module 1" and "Module 2" on the front side. Adjustment needs to be done if the light barrier flag is misadjusted and as a result the suction cups do not suck the IP properly.

Carry out this adjustment only if it is sure that the rotation unit is misadjusted, see check in section 2.1.3. Normally the light barrier flag is pre-adjusted in production and secured by a positioning bracket.

DANGER:

Risk of injury from moving parts of rotation drive.
The rotation drive turns very quickly! Keep hair, hand and clothing clear when machine is running with the doors open.
Overview of the Procedure

1. Enter Service Menu
2. Turn Cassette Module 1 to the right side (see 2.1.2)
3. Check Position visually (see 2.1.3)
   - Too far left
   - Too far right
4. OK
5. Turn Cassette Module 2 to the right side (see 2.1.2)
6. Move flag on Cassette Module 2 to the left side (see 2.1.4)
7. Turn Cassette Module 2 to the right side (see 2.1.2)
8. Move flag on Cassette Module 2 to the right side (see 2.1.4)
9. Turn Cassette Module 1 to the right side (see 2.1.2)
10. Move flag on Cassette Module 1 to the left side (see 2.1.4)
11. Turn Cassette Module 1 to the right side (see 2.1.2)
12. Move flag on Cassette Module 1 to the right side (see 2.1.4)
13. Perform an Adjustment Cycle (see 2.1.5)

figure 2
2.1.2 Turning Cassette Module 1 / 2 to the right side

(1) Enter the Service menu.

(2) Select <7 DIAGNOSTICS>.

(3) Select <2 Mechanical modules>.

(4) Select <2 Cassette module 1 > resp. <3 Cassette module 2 >
   The selected cassette module will be moved in input position.

(5) Press confirm key ✓.

(6) Check and press the confirm key ✓.

(7) Press confirm key ✓.
(8) Press right arrow key to exit.

(9) Press confirm key .

(10) Check if an error occurred.
2.1.3 Checking Position visually

Rough check of ideal position

Middle axis of the two cassette modules 1 and hole in the frame 2 must be exactly on one line 3 (see figure 10).

Fine check of ideal position

Distance 1 = Distance 2 if flag is adjusted correctly (see figure 11).
2.1.4 Movement of flag on Cassette Module 1 / 2 to left / right side

The movement of the flag is approximately equal to the difference of the middle axis of the cassette modules to the hole in the frame (e.g. if cassette module 1 is 2 mm too far left, move the flag on cassette module 2 for 2 mm to the left side).

1. Unscrew the two screws (A) of the positioning bracket.
2. Loosen the two screws (B) of the light barrier flag and move it in corresponding direction.
3. Tighten the screws.
4. Screw on positioning bracket.

2.1.5 Performing Adjustment Cycle

NOTE:

Make sure that the position of both cassette modules are correct before you perform an Adjustment Cycle (see 2.4 of this Chapter).
2.2 Adjustment of Guiding Plate in Postscan Unit

REQUIRED TIME:
Approximately 30 min.

2.2.1 General

If a guiding plate is not in perfect position the IP may be misguided. The robot carriage cannot insert the IP in the cassette correctly.

Error message 22D60: “Cassette jam occurred during output in output buffer”

figure 13

figure 14
2.2.2 Adjustment Procedure

(1) Take the transport unit out of the digitizer.

(2) Loosen the screws that hold the guiding plate.

(3) Put the suction cups of the robot carriage in upward position.

(4) Move the robot carriage manually upwards to the top.

(5) During the last 10 cm of the upward movement the space between the white plastic gearwheel and the guiding plate has to be examined.

(6) While the robot carriage is being moved to the very top the plastic gear wheel comes very close to the guiding plate.
(7) When the plastic gear wheel reaches the closest point to the guiding plate, the space should not exceed 1 or 2 mm.

(8) If the guiding plate touches the plastic gear wheel, touch the bottom ledge of the guiding plate and move the guiding plate away from the plastic gear wheel.

(9) If the space between guiding plate and plastic gear wheel is more than 2 mm, touch the bottom ledge of the guiding plate and move the guiding plate towards the plastic gear wheel.

(10) When the perfect space is reached (1 or 2 mm), fix one screw at the front of the ledge and check the distance again.

(11) If the space is different to 1 or 2 mm, readjust the guiding plate.

(12) Repeat readjustment until the screws are fixed and the perfect space is reached.

(13) Move the IP transport unit back in its work position.
2.3 Check Position of Suction Cups

REQUIRED TIME:
Approximately 30 min.

Problems with insufficient vacuum at the image plate can be caused by non parallel suction cups. To check if the suction cups are parallel, work out the following steps:

(1) Take the transport unit out of the digitizer.

(2) The robot needs to be in lowest position at the transport unit and in horizontal alignment.

(3) Check if the rib of the suction cup holder of the input robot corresponds with the upper recess of the suction arm.

(4) Check if the rib of the suction cup holder of the output robot corresponds with the lower recess of the suction arm.
2.4 Adjustment Cycle of Transport Robot

REQUIRED TIME:
Approximately 30 min.

An adjustment cycle is necessary to define the position of the suction cups and the return position of the IP.

NOTE:
- Before an adjustment cycle is carried out, make sure that both cassette modules of the rotation unit are adjusted correctly (see section 2.1 of this Chapter).
- Shown display menus are based on Software Version ACP_4105 and may vary with further Software updates.

1. Enter the Service menu.
2. Select <2 MAINTENANCE>.
3. Select <3 Test and adjust cycle>.
4. Select <5 Adjustment cycle>.
5. Start the adjustment cycle by inserting a large format ADC Cassette.
(6) The vertical adjustment is done by pressing the arrow keys at the keypad of the digitizer.

The ideal position of the IP is in the middle of the Cassette or with a tendency to the right side of the Cassette (towards the front of the digitizer). Tolerance is 2 mm.

(7) Close the left door of the digitizer, when the adjustment of the IP inside the Cassette is finished.

(8) If the IP is not in the right horizontal position you have to move the IP stop plate:

- Mark the start position on plate and screw with a vertical line with a permanent marker.
- Movement of the plate is equivalent to the change in position of the IP in the Cassette.

(9) Select <2 MAINTENANCE>.
(10) Select <3 Test and adjust cycle>.

(11) Select <4 Handling Cycle>.

(12) Carry out two cycles without changing the adjustment, because the second time the other Cassette Module is picking up the IP.

(13) Check the position of the IP in the cassette.

(14) If the position is ok, repeat the procedure <4 Handling Cycle> three times with a cassette format 35 x 43 cm and three times with 18 x 24 cm.

If the position is not ok, you have to find a compromise for both units. Move the stop plate corresponding to the IP position but remember, it will also affect the other unit. Redo (8) to (14) until the position is for both units ok (see above).

(15) Create a new backup floppy to save the settings for the vertical adjustment.
3  **Calibrations**

**NOTE:**  
Make sure that the used IPs are dry, clean and do not have artifacts such as scratches or contamination.

### 3.1 Possible Reasons for a Calibration

**IMPORTANT:**  
If an IP-center calibration is necessary, always perform a shading calibration afterwards.

<table>
<thead>
<tr>
<th>Calibration</th>
<th>When</th>
<th>Details see</th>
<th>Time</th>
</tr>
</thead>
</table>
| IP-Center Calibration  | • The optic module has been exchanged.  
                       | • The pin diode board (GS 626) and/or the light barrier IR Receiver (GS 628) have been replaced.  
                       | • White borders on the Mammo diagnostic images are present.* | 3.2 Approx. 30 min. |
| Shading Calibration    | • IP-Center Calibration has been performed.  
                       | • The optic module has been exchanged.  
                       | • The LISA module (photomultiplier with light collector) has been exchanged.  
                       | • The scan unit has been replaced.  
                       | • Unacceptable line artifacts (stripes) in slow scan direction are still visible on the diagnostic image after cleaning the scan area. | 3.3 Approx. 1 h. |

* only on 24 x 30 cm and 18 x 24 cm cassette formats. The white border is present only on one side of the image.
3.2 IP-Center Calibration

REQUIRED TIME:
Approximately 30 min.

PREREQUISITES / REQUIRED TOOLS:

- **X-ray source (GenRad recommended)**
  If a **GenRad X-ray source** is available, this should be used for all applications: the GenRad, Mammo and Extremity.
  For a pure Mammo site use a **Mammography X-ray source** with the largest available bucky.

- **Cassette:**
  - GenRad (24 x 30 cm or smaller),
  - Mammo (18 x 24 cm):
    Always expose the smallest cassette format used in the hospital.
    If the cassette format 18 x 24 cm is not available, the calibration can also be performed with a 24 x 30 cm cassette.

- **For a GenRad X-ray source:**
  Cu-filter which has the spare part number*: CM+9 5155 1015 2

- **For a Mammography X-ray source:**
  Al-filter which has the spare part number*: CM+9 5148 1090 0

* The last digit in the spare part number indicates the spare part revision at release of this document. When ordering, the actual revision of the spare part is delivered.

NOTE:
The GenRad X-ray source and the Mammography X-ray source require different prerequisites.
Do not use GenRad X-ray source with Al-filter or Mammography X-ray source with Cu-filter!

NOTE:
For Mammography X-ray source, in order to fix the Al-filter below the collimation window, a reliable adhesive tape is necessary. Depending on the adhesive tape, a solvent may be required for the cleaning of the X-ray source. Make sure the tape is not getting in the optical path of the X-rays.
The IP-center calibration procedure consists of the following steps:

<table>
<thead>
<tr>
<th>How?</th>
<th>Procedure</th>
<th>Details see</th>
</tr>
</thead>
<tbody>
<tr>
<td></td>
<td>Erase cassette</td>
<td>3.2.1</td>
</tr>
<tr>
<td></td>
<td>Expose cassette</td>
<td>3.2.2</td>
</tr>
<tr>
<td></td>
<td>Start IP center calibration</td>
<td>3.2.3</td>
</tr>
<tr>
<td></td>
<td>Verification</td>
<td>3.4</td>
</tr>
</tbody>
</table>

### 3.2.1 Erase the Cassette

1. Press the Erase key on the local keypad of the digitizer and the following screen appears:

   ![BUSY ERASURE WARNING](5148_Chap03.6_039.cdr)

   - The next cassette(s) will be erased
   - Enter number of cassettes to erase: 1
   - Put cassette in input buffer or press X to quit

   ![figure 28](5148_Chap03.6_039.cdr)

2. Place the cassette in the input buffer of the digitizer.

3. Wait for the erased cassette at the output buffer.
3.2.2 Expose the Cassette

3.2.2.1 Exposure of the Cassette for a GenRad X-ray source

(1) Place the cassette in length direction to the X-ray tube as shown in figure 29.

(2) Ensure that the entire image plate is fully exposed! The collimated field must be larger than the image plate!

(3) Place the Cu-filter below the collimation window.

(4) Select the following exposure parameters to obtain a dose of 10 µGy:
   - 12 mAs,
   - 75 kV,
   - 1.3 m (51.2") distance,
   - Large focus.

NOTE:
Best use a dosimeter to measure the dose!

(5) Expose the cassette.

(6) Turn the cassette 180°.
3.2.2.2 Exposure of the Cassette for a Mammography X-ray source

NOTE: The exposure of the Mammo cassette with a Mammography X-ray source is only applicable for the Mammography IP-center calibration.

Goal Expose at least the half of the cassette (tube side up), which lies opposite to the chestwall side, see figure 31.

(1) Remove the compression paddle.

(2) Check that the appropriate window is selected according to the bucky size.

If both, the 18 x 24 cm and the 24 x 30 cm, buckies are available, the smallest cassette format (18 x 24 cm) has to be used with the largest bucky size (24 x 30 cm). For this purpose refer to column 1 of the following table.

If only one bucky size is available (cassette format is then identical to the bucky size) refer to column 2 of the following table.

(7) Expose the cassette again. After the second exposure the cassette has been exposed in total with a dose of 20 µGy.

(8) Remove the Cu-filter.
## Repair and Service
### Adjustments and Calibrations

<table>
<thead>
<tr>
<th>Column 1:</th>
<th>Column 2:</th>
</tr>
</thead>
<tbody>
<tr>
<td><strong>(3)</strong> Select the following exposure parameters:</td>
<td>Select the following exposure parameters:</td>
</tr>
<tr>
<td>- 20 mAs</td>
<td>- 2 x 10 mAs</td>
</tr>
<tr>
<td>- 28 kV</td>
<td>- 28 kV</td>
</tr>
<tr>
<td>- Molybdenium source / Molybdenium filter (Mo/Mo)</td>
<td>- Molybdenium source / Molybdenium filter (Mo/Mo)</td>
</tr>
<tr>
<td>- Large focus</td>
<td>- Large focus</td>
</tr>
<tr>
<td><strong>(4)</strong> Insert a dummy Mammography cassette in the bucky to activate the X-ray modality.</td>
<td>Insert a dummy Mammography cassette in the bucky to activate the X-ray modality.</td>
</tr>
<tr>
<td><strong>(5)</strong> Place the cassette on the bucky:</td>
<td>Place the cassette on the bucky:</td>
</tr>
<tr>
<td>- With tube side up</td>
<td>- With tube side up</td>
</tr>
<tr>
<td>- Horizontally centered</td>
<td>- With a slight offset in horizontal direction.</td>
</tr>
<tr>
<td>Move the cassette vertically towards the bucky chestwall, so that the rear half (opening side) of the cassette is in the middle of the collimation window.</td>
<td>Move the cassette vertically towards bucky chestwall, so that the rear half (opening side) of the cassette is in the collimation window.</td>
</tr>
<tr>
<td>The marked area in figure 33 must be within the collimation window.</td>
<td></td>
</tr>
<tr>
<td><strong>(6)</strong> Fix the Al-filter below the collimation window and make sure the tape is not getting in the optical path of the X-rays.</td>
<td>Fix the Al-filter below the collimation window and make sure the tape is not getting in the optical path of the X-rays.</td>
</tr>
<tr>
<td><strong>(7)</strong> Expose the cassette. Perform one single exposure! Rotation of cassette is not required.</td>
<td>Expose the cassette.</td>
</tr>
<tr>
<td><strong>(8)</strong> n.a.</td>
<td>Remove the Al-filter.</td>
</tr>
</tbody>
</table>

![figure 32](image1.png)

![figure 33](image2.png)

---

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<table>
<thead>
<tr>
<th>Column 1:</th>
<th>Column 2:</th>
</tr>
</thead>
<tbody>
<tr>
<td>(9) n.a.</td>
<td>Leave the cassette on the bucky with tube side up. Move the cassette horizontally to the other side of the bucky and vertically towards bucky chestwall, so that the rear half (opening side) of the cassette is in the collimation window. The marked area in figure 34 must be within the collimation window.</td>
</tr>
<tr>
<td>(10) n.a.</td>
<td>Fix the Al-filter below the collimation window and make sure the tape is not getting in the optical path of the X-rays.</td>
</tr>
<tr>
<td>(11) n.a.</td>
<td>Expose the cassette.</td>
</tr>
<tr>
<td>(12)</td>
<td>Remove the Al-filter.</td>
</tr>
<tr>
<td>(13)</td>
<td>Clean the X-ray source with a solvent.</td>
</tr>
</tbody>
</table>

**Diagram:**
- **bucky**
- **collimation window**
- **cassette**
- **(chestwall)**

**Figure 34**
3.2.3 Start the IP-Center Calibration

NOTE:
Close the doors of the digitizer during calibration.

(1) Enter the Service menu.

(2) Select <2 MAINTENANCE> <2 Calibration> <1 IP center calibration>

After the application has been chosen the exposure parameters for the cassette are shown on the display.

These parameters are only valid for a GenRad X-ray source. If a Mammography X-ray source is used, refer to the exposure parameters in step (3) of section 3.2.2.2.

(3) Insert the exposed cassette in the digitizer.

(4) In case the cassette has been identified by mistake the following screen will be displayed:
- Press the escape key, if you want to scan the cassette: the name of the patient will be shown.
- Press the confirm key, if you want to start the calibration.

(5) If the right format is detected the calibration starts automatically and you can skip step (6).

(6) If the wrong format is detected a warning message will be displayed.
- Press the confirm key to start the calibration with the wrong format, or
- Press the escape key to stop calibration.

Remove the cassette and press confirm key. The calibration main screen will be displayed.
(7) The IP-center calibration has been successful, if the message *Calibration successful* pops up.

If the calibration has not been successful, continue with section 3.2.4.

(8) Press confirm key ✔.

(9) Perform a shading calibration (see section 3.3) and finally a verification (see section 3.4).

### 3.2.4 Failed IP-Center Calibration

Find the possible results of a failed IP-center calibration below:

<table>
<thead>
<tr>
<th>Information on the Display</th>
<th>Reason</th>
<th>Details see</th>
</tr>
</thead>
<tbody>
<tr>
<td>Check collimation and optics</td>
<td>Flatfield was not used.</td>
<td>3.2.4.1</td>
</tr>
<tr>
<td></td>
<td>A defective IP was used (with scratches in slow-scan direction).</td>
<td></td>
</tr>
<tr>
<td>Underexposed</td>
<td>The exposure conditions were wrong (e.g. the dose was too low).</td>
<td>3.2.4.2</td>
</tr>
<tr>
<td></td>
<td>The filter was not positioned correctly.</td>
<td></td>
</tr>
<tr>
<td></td>
<td>The photomultiplier floppy was not installed properly after a PMT replacement.</td>
<td></td>
</tr>
<tr>
<td></td>
<td>The backup floppy was not installed properly after a software installation including hard disk formatting.</td>
<td></td>
</tr>
<tr>
<td>Overexposed</td>
<td>The exposure conditions were wrong (e.g. the dose was too high).</td>
<td>3.2.4.3</td>
</tr>
<tr>
<td></td>
<td>The filter was not positioned correctly.</td>
<td></td>
</tr>
<tr>
<td></td>
<td>The photomultiplier floppy was not installed properly after a PMT replacement.</td>
<td></td>
</tr>
<tr>
<td></td>
<td>The backup floppy was not installed properly after a software installation including hard disk formatting.</td>
<td></td>
</tr>
</tbody>
</table>
NOTE:
The Scan Average Level (SAL) is the digital 12 bit value (gray scale) of a pixel and is one of the criteria for a successful calibration. The SAL values during a calibration must be in a range of approximately 730 to 4095.

3.2.4.1 Check collimation and optics (dynamic range bigger than 1:2)

(1) A failure message pops up with a long beep.

(2) Press the confirm key.
Make sure that the IP was exposed without collimation.
Check the IP for scratches in slow scan direction.
Redo calibration.

(3) Otherwise, press the escape key to cancel the calibration.

(4) Redo calibration.

3.2.4.2 Underexposed (SAL < 730)

(1) A failure message pops up.

(2) Press the confirm key.
Increase the exposure dose.
Check the exposure conditions and the filter alignment.
Redo the calibration.

(3) If the failure message pops up again, press the escape key.
Check if the photomultiplier floppy was installed properly after a PMT replacement.
Check if the backup floppy was installed properly after a software installation including hard disk formatting.
Install the corresponding floppy if necessary.
Redo the calibration.
3.2.4.3 Overexposed (SAL > 4095)

(1) A failure message pops up.

(2) Press the confirm key \(\checkmark\),
   Decrease the exposure dose.
   Check the exposure conditions and the filter alignment.
   Redo the calibration.

(3) If the failure message pops up again, press the escape key \(\times\).
   Check if the photomultiplier floppy was installed properly after a PMT replacement.
   Check if the backup floppy was installed properly after a software installation including hard disk formatting.
   Install the corresponding floppy if necessary.
   Redo the calibration.
3.3 Shading Calibration

REQUIRED TIME:
Approximately 60 min.

PREREQUISITES / REQUIRED TOOLS:

- **X-ray source (GenRad recommended)**
  If a GenRad X-ray source is available, this should be used for all applications: the GenRad, Mammo and Extremity.
  For a pure Mammo site use a Mammography X-ray source with the largest available bucky.

- **Cassette format (GenRad: 35 x 43 cm or Mammo: 24 x 30 cm):**
  Always expose the largest cassette format used in the hospital.
  If the cassette format 18 x 24 cm is used, the calibration is not valid for 24 x 30 cm cassette formats or higher!

- **For a GenRad X-ray source:**
  - Cu-filter which has the spare part number*: CM+9 5155 1015 2

- **For a Mammography X-ray source:**
  - Al-filter which has the spare part number*: CM+9 5148 1090 0
  - CR Mammography calibration kit which has the spare part number*: 10+7 9820 0424 0

* The last digit in the spare part number indicates the spare part revision at release of this document. When ordering, the actual revision of the spare part is delivered.

NOTE:
The GenRad X-ray source and the Mammography X-ray source require different prerequisites.
Do not use GenRad X-ray source with Al-filter or Mammography X-ray source with Cu-filter!

NOTE:
For Mammography X-ray source, in order to fix the Al-filter below the collimation window, a reliable adhesive tape is necessary. Depending on the adhesive tape, a solvent may be required for the cleaning of the X-ray source. Make sure the tape is not getting in the optical path of the X-rays.
The shading calibration procedure consists of the following steps:

<table>
<thead>
<tr>
<th>How?</th>
<th>Procedure</th>
<th>Details see</th>
</tr>
</thead>
<tbody>
<tr>
<td></td>
<td>Erase cassette</td>
<td>3.3.1</td>
</tr>
<tr>
<td></td>
<td>Expose cassette</td>
<td>3.3.2</td>
</tr>
<tr>
<td></td>
<td>Start shading calibration</td>
<td>3.3.3</td>
</tr>
<tr>
<td></td>
<td>Verification</td>
<td>3.4</td>
</tr>
</tbody>
</table>

### 3.3.1 Erase the Cassette

1. Press the Erase key on the local keypad of the digitizer and the following screen appears (see figure 39).

2. Place the cassette in the input buffer of the digitizer.

3. Wait for erased cassette at the output buffer.

### 3.3.2 Expose the Cassette

**NOTE:**

The GenRad X-ray source can be used for both, the GenRad and the Mammo, calibration procedure.
3.3.2.1 Exposure of the Cassette for a GenRad X-ray source

(1) Place the largest cassette in length direction to the X-ray tube as shown in figure 40.

(2) Ensure that the entire image plate is fully exposed! The collimated field must be larger than the image plate!

(3) Place the Cu-filter below the collimation window.

(4) Select the following exposure parameters to obtain a dose of 10 µGy:
   - 12 mAs,
   - 75 kV,
   - 1.3 m (51,2") distance,
   - Large focus.

NOTE:
Best use a dosimeter to measure the dose!

(5) Expose the cassette.

(6) Turn the cassette 180°.

(7) Expose the cassette again. After the second exposure the cassette has been exposed in total with a dose of 20 µGy.

(8) Remove the Cu-filter.
3.3.2.2 Exposure of the “CR Mammo Calibration Kit” Cassette for a Mammography X-ray source

NOTE:
The exposure of the “CR Mammo Calibration Kit” cassette with a Mammography X-ray source is only applicable for the Mammography shading calibration.

(1) Remove the compression paddle.

(2) Fix the Al-filter below the collimation window and check that the appropriate window is selected according to the bucky size. Make sure the tape is not getting in the optical path of the X-rays.

(3) Select the following exposure parameters:
- 200 mAs,
- 28 kV,
- Molybdenium source / Molybdenium filter (Mo/Mo),
- large focus.

(4) Put the cassette in the bucky.

(5) Expose the cassette.

NOTE:
Perform one single exposure!
Rotation of cassette is not required.

(6) Remove the Al-filter.

(7) Clean the X-ray source with a solvent.

3.3.3 Start the Shading Calibration

NOTE:
Close the doors of the digitizer during calibration.
(1) Enter the Service menu.

(2) Select <2 MAINTENANCE>

<2 Calibration>.

<2 Shading Calibration>.

(3) Choose one of 4 possible applications for shading calibration (details see table below).

When an application has been calibrated successfully, the remark "o.k." will be shown next to the application on the display (see figure 42).

<table>
<thead>
<tr>
<th>Application</th>
<th>Selection on the User Interface</th>
<th>Exposure Type (X-ray source)</th>
<th>Remarks</th>
<th>Details see</th>
</tr>
</thead>
<tbody>
<tr>
<td>GenRad</td>
<td>1 GenRad fast*</td>
<td>GenRad (default selection)</td>
<td>- Use the biggest GenRad cassette available (35x43 cm)</td>
<td>3.3.3.1</td>
</tr>
<tr>
<td></td>
<td>2 GenRad slow</td>
<td></td>
<td>- Use Cu-filter</td>
<td></td>
</tr>
<tr>
<td>Mammo</td>
<td>3 Mammo</td>
<td>GenRad (recommended if available)</td>
<td>- Use the biggest GenRad cassette available (35x43 cm)</td>
<td>3.3.3.2</td>
</tr>
<tr>
<td></td>
<td></td>
<td></td>
<td>- Use Cu-filter.</td>
<td></td>
</tr>
<tr>
<td></td>
<td></td>
<td>Mammo</td>
<td>- Choose a X-ray source with the smallest heel effect.**</td>
<td>3.3.3.1</td>
</tr>
<tr>
<td></td>
<td></td>
<td></td>
<td>- Use the biggest Mammo cassette available (24x30 cm)</td>
<td></td>
</tr>
<tr>
<td></td>
<td></td>
<td></td>
<td>- Use Al-filter.</td>
<td></td>
</tr>
<tr>
<td>Extremity</td>
<td>4 Extremity</td>
<td>GenRad (default selection)</td>
<td>- Use the biggest GenRad cassette available (35x43 cm)</td>
<td>3.3.3.1</td>
</tr>
<tr>
<td></td>
<td></td>
<td></td>
<td>- Use Cu-filter.</td>
<td></td>
</tr>
</tbody>
</table>

* The GenRad formats 35 x 35 cm and 35 x 43 cm are always scanned in Fast Scan Mode.
** In general modalities of Siemens are known to have a low heel effect.

NOTE:
If the Mammo application is not activated:
- A Mammo shading calibration with a GenRad cassette can be performed, anyway.
- A Mammo shading calibration with a Mammo Cassette can not be performed.
3.3.3.1 Application “GenRad” or “Extremity”

After the application has been chosen the exposure parameters for the cassette are shown on the display.

```
<table>
<thead>
<tr>
<th>Exposure parameters:</th>
</tr>
</thead>
<tbody>
<tr>
<td>Filter: 1.5 mm Cu</td>
</tr>
<tr>
<td>2 exposures a 10 microGy</td>
</tr>
<tr>
<td>turn 180 degree</td>
</tr>
<tr>
<td>(Approx. FFDist. 1.3 m,</td>
</tr>
<tr>
<td>12 mAs, 75 kVp)</td>
</tr>
</tbody>
</table>

Insert cassette 35x43cm
```

figure 43

(1) Insert the exposed cassette.

(2) In case the cassette has been identified by mistake the following screen will be displayed:
   - Press the escape key \(\times\), if you want to scan the cassette: the name of the patient will be shown.
   - Press the confirm key \(\checkmark\), if you want to start the calibration.

```
| Cassette is identified with patient data. |
| Press \(\checkmark\) to calibrate or X to scan. |
```

figure 44

(3) If the right format is detected the calibration starts automatically and you can skip step (4).

(4) If the wrong format is detected a warning message will be displayed.
   - Press the confirm key \(\checkmark\) to start the calibration with the wrong format, or
   - Press the escape key \(\times\) to stop calibration. Remove the cassette and press confirm key \(\checkmark\).

```
| Format is smaller than recommended! |
| Shading calibration will only be valid for calibrated format and smaller ones. |
```

figure 45

The calibration main screen will be displayed. Continue with section 3.3.2.
(5) If the shading calibration has been successful the message Calibration successful pops up (e.g. “GenRad fast”).

If the calibration has not been successful, continue with section 3.3.4.

![Service menu Calibration Shading]

(6) Press confirm key.

(7) Redo the calibration for the next application, shown on the display. Continue with section 3.3.2.

When an application has been calibrated successfully, the remark “o.k.” will be shown next to the application on the display (see figure 42).

When all 3 applications (GenRad fast, GenRad slow and Extremity) have been performed continue with the Mammo application (see section 3.3.3.2).

(8) Perform verification (see section 3.4), after all applications have been calibrated.

3.3.3.2 Application “Mammo”

Two possible exposure types can be chosen:

- **GenRad**, if a GenRad X-ray source is available,
- **Mammo**, if only a Mamography X-ray source is available.

(1) Choose one of the 2 possible exposure types.

![Select exposure type]

figure 47
**Exposure Type "GenRad" chosen**

After the application has been chosen the exposure parameters for the cassette are shown on the display.

![Exposure parameters:](5148_Chap03.6_009.cdr)

**Exposure parameters:**
- Filter: 1.5 mm Cu
- 2 exposures a 10 microGy
- turn 180 degree
- (Approx. FFDist. 1.3 m, 12 mAs, 75 kVp)

**Insert cassette 35x43cm**

![figure 48](5148_Chap03.6_009.cdr)

1. Insert the exposed cassette.

2. In case the cassette has been identified by mistake the following screen will be displayed:
   - Press the escape key \(\times\), if you want to scan the cassette: the name of the patient will be shown.
   - Press the confirm key ✓, if you want to start the calibration.

![figure 49](5148_Chap03.6_030.cdr)

3. If the right format is detected the calibration starts automatically and you can skip step (4).

4. If the wrong format is detected a warning message will be displayed.
   - Press the confirm key ✓ to start the calibration with the wrong format, or
   - Press the escape key \(\times\) to stop calibration.

Remove the cassette and press confirm key ✓.

The calibration main screen will be displayed. Continue with section 3.3.2.

![figure 50](5148_Chap01_027.cdr)

**Format is smaller than recommended!**

Shading calibration will only be valid for calibrated format and smaller ones.

![Service menu](5148_Chap01_027.cdr)
(5) If the shading calibration has been successful the message *Calibration successful* pops up (e. g. “Mammo”).

If the calibration has not been successful, continue with section 3.3.4.

(6) Press confirm key \(\checkmark\).

(7) Perform verification (see section3.4), after all applications have been calibrated.

**Exposure Type “Mammo” chosen**

**IMPORTANT:**
Ensure that the "CR Mammography calibration kit" cassette is used for the following steps!

After the application has been chosen the exposure parameters for the cassette are shown on the display.

(1) Insert the exposed cassette.

(2) In case the cassette has been identified by mistake the following screen will be displayed:
- Press the escape key \(\times\), if you want to scan the cassette: the name of the patient will be shown.
- Press the confirm key \(\checkmark\), if you want to start the calibration.

(3) If the right format is detected the calibration starts automatically and you can skip step (4).
(4) If the wrong format is detected a warning message will be displayed.
   - Press the confirm key ✅ to start the calibration with the wrong format, or
   - Press the escape key ❌ to stop calibration.
   Remove the cassette and press the confirm key ✅.

   The calibration main screen will be displayed. Continue with section 3.3.2.

(5) If the shading calibration has been successful the message Calibration successful pops up (e.g. “Mammo”).

   If the calibration has not been successful, continue with section 3.3.4.

(6) Press confirm key ✅.

(7) Perform verification (see section 3.4), after all applications have been calibrated.
### 3.3.4 Failed Shading Calibration

Find the possible reasons for a failed shading calibration below:

<table>
<thead>
<tr>
<th>Information on the Display</th>
<th>Reason</th>
<th>Details see</th>
</tr>
</thead>
</table>
| **Underexposed**           | • The exposure conditions were wrong (e.g. the dose was too low).  
                            • The filter was not positioned correctly.  
                            • The photomultiplier floppy was not installed properly after a photomultiplier (PMT) replacement.  
                            • The backup floppy was not installed properly after a software installation including hard disk formatting. | 3.3.4.1 |
| **Overexposed**            | • The exposure conditions were wrong (e.g. the dose was too high).  
                            • The filter was not positioned correctly.  
                            • The photomultiplier floppy was not installed properly after a PMT replacement.  
                            • The backup floppy was not installed properly after a software installation including hard disk formatting. | 3.3.4.2 |
| **Dust detected**          | • Dust is present on the IP.  
                            • Flatfield was not used. | 3.3.4.3 |
| **Check coll. and optics** | • Flatfield was not used.  
                            • Collimation was used.  
                            • A defective IP was used (with scratches in slow-scan direction). | 3.3.4.4 |
| **Modality is vignetting** | • **GenRad:**  
                            - Flatfield was not used.  
                            - A defective IP was used.  
                            - The collimation was used.  
                            • **Mammography:**  
                            - Flatfield was not used.  
                            - A defective IP was used. | 3.3.4.5 |

NOTE:  
The Scan Average Level (SAL) is the digital 12 bit value (gray scale) of a pixel and is one of the criteria for a successful calibration. The SAL values during a calibration must be in a range of approximately 730 to 4095.
3.3.4.1 Underexposed (SAL < 730)

(1) A failure message pops up.

(2) Press the confirm key [ok].
   Increase the exposure dose.
   Check the exposure conditions and the filter alignment. 
   Redo the calibration.

(3) If the failure message pops up again, press the escape key [x].
   Check if the photomultiplier floppy was installed properly after a PMT replacement.
   Check if the backup floppy was installed properly after a software installation including hard disk formatting.
   Install the corresponding floppy if necessary.
   Redo the calibration.

3.3.4.2 Overexposed (SAL > 4095)

(1) A failure message pops up.

(2) Press the confirm key [ok].
   Decrease the exposure dose.
   Check the exposure conditions and the filter alignment.
   Redo the calibration.

IMPORTANT:
For Mammography X-ray source, even if the dose has to be decreased due to overexposure, the settings must not fall below 50 mAs and 0.5 s.
(3) If the failure message pops up again, press the escape key. Check if the photomultiplier floppy was installed properly after a PMT replacement.
Check if the backup floppy was installed properly after a software installation including hard disk formatting.
Install the corresponding floppy if necessary.
Redo the calibration.

3.3.4.3 Dust detected

(2) A failure message pops up with a long beep.

(3) Press the confirm key.

(4) Check if the exposure parameters have been the same as shown on the display.

(5) Clean the optics with the built-in brush.

(6) Check on the IP the presence of scratches in slow scan direction and of dust.
Look for another IP which is dry, clean and immaculate.

(7) Redo calibration.

3.3.4.4 Check collimation and optics (dynamic range bigger than 1:2)

(1) A failure message pops up (e.g. “GenRad fast”) with a long beep.

![Service menu](image)

GenRad fast
Calibration failed!
Check coll. and optics
...press to repeat

figure 58
(2) Press the confirm key ✔.
Make sure that the IP was exposed without collimation and with the exposure parameters shown on the display.
Check the IP for scratches in slow scan direction.
Redo calibration.

In case the Mammo exposure type was selected and the above actions do not show success:
- Look for the Mammography X-ray source with the smallest heel effect.
- Redo the calibration with this X-ray source and use the same bucky size as for the first exposure.

(3) Otherwise, press the escape key × to cancel the calibration.
(4) Redo calibration.

3.3.4.5 Modality is vignetting (warning message only)

(1) A Calibration successful screen (e. g. “Mammo”) pops up.

(2) Press confirm key ✔.

(3) A warning message pops up if the signal dropped below the acceptable limit within a range of 3 mm at the left or right border.

(4) Press the confirm key ✔.
(5) Check if:
- The exposure parameters have been the same as shown on the display.
- The collimation was used properly (if the exposure type is GenRad).
- The IP has no scratches in slow scan direction or has no dust.
- The photomultiplier floppy was properly installed after a PMT replacement.
- The backup floppy was properly installed after a software installation including hard disk formatting.

(6) Redo the calibration.

(7) If the above actions do not show success and in case the Mammo exposure type was selected:
- Look for the Mammography X-ray source with the smallest heel effect.
- Redo the calibration with this X-ray source and use the same bucky size as for the first exposure.

(8) If the warning message still pops up, and still in case the Mammo exposure type was selected, the following workaround is possible:
- Take a flatfield as evidence that the collimation area of the X-ray source does not fit with the IP position in the bucky.
- Explain the problem to the customer and ask him to call the X-ray supplier for a service intervention.
- Carry out a final calibration after the service intervention on the X-ray source.

NOTE:

In this workaround the left and the right 3 mm of the image are not shading calibrated. It is the customer’s responsibility to use this workaround and to handle the mismatch of cassette position and beam collimation.
3.4 Verification of the Calibration

**NOTE:**
The calibration verification is always taking place after the shading calibration was performed. There is no sense to perform the IP-center calibration verification before the shading calibration procedure is done.

(1) Expose a cassette with a regular flatfield, to check the image quality of each used application as described in the following table:

<table>
<thead>
<tr>
<th>Application</th>
<th>Required Cassette</th>
<th>Procedure</th>
</tr>
</thead>
<tbody>
<tr>
<td>GenRad fast</td>
<td>GenRad 35 x 43 cm</td>
<td>3.3.2.1</td>
</tr>
<tr>
<td>GenRad slow (^{(1)})</td>
<td>any GenRad cassette beside 35 x 43 cm and 35 x 35 cm</td>
<td>3.3.2.1</td>
</tr>
<tr>
<td>Mammography</td>
<td>largest format available</td>
<td>3.3.3.2 (^{(2)})</td>
</tr>
<tr>
<td>Extremity</td>
<td>Extremity 35 x 43 cm (^{(3)})</td>
<td>3.3.2.1</td>
</tr>
</tbody>
</table>

\(^{(1)}\) Only if digitizer is in slow mode.

\(^{(2)}\) If a Mammo X-ray modality is used, select 40 mAs instead 200 mAs for the Flatfield exposure.

\(^{(3)}\) You can also temporarily re-initialize a GenRad 35 x 43 cm cassette.
(2) Identify the cassette as follows:

For GenRad application:

On CR QS Processing Station:
- Select Study type: *System Diagnosis*.
- Select Substudy: *Flatfield*.
- Confirm Exposure class: *200*.

On NX Processing Station:
- Select Exam Group: *System Diagnosis*.
- Select Exposure Type: *FlatField*.
- Confirm Detector Sensitivity: *200*.
For Mammo application:

On CR QS Processing Station:

- Select **Study type**: <System Diagnosis>.
- Select **Substudy**: <Flat field Mammo>.
- Confirm **Exposure class**: <50>.

On NX Processing Station:

- Select **Exam Group**: <System Diagnosis>.
- Select **Exposure Type**: <FlatField Mammo>.
- Confirm **Detector Sensitivity**: <50>.

(3) Insert the cassette into the Digitizer.

(4) Print the image with a window setting of 1.2 (level setting leaves unchanged).

(5) Check the image quality of the flatfield for absence of any stripes and large area inhomogenities (shading calibration) and for absence of lateral borders (IP-center calibration).

(6) Start the backup to save the new calibration parameters (see section 4).
4 Backup

(1) Update the backup storage media to save the new machine specific data (calibration, PD-factor).

(2) Enter the Service Menu.

(3) Select `<3 Save data>
  `<2 Machine specific data>.

(4) Follow the on-line instructions.
Chapter 3.7 is not applicable and therefore intentionally left blank.
Purpose of this Document

This document describes all customer released software versions*.

* Previously supplied software versions (prior to version ACP_4005) are no more listed in this document.

Document History

<table>
<thead>
<tr>
<th>Edition. Revision</th>
<th>Release Date</th>
<th>Changes</th>
</tr>
</thead>
<tbody>
<tr>
<td>1.0 07-2010</td>
<td>The content of this document was previously split in two separate documents:</td>
<td></td>
</tr>
<tr>
<td></td>
<td>• CR 85-X Type 5148/100, CR 75.0 Type 5146/105 (As of SN ≥ 6000), Chapter 3.8, DD+DIS378.05 with Edition 2, Revision 0.</td>
<td></td>
</tr>
<tr>
<td></td>
<td>• CR 75.0 Type 5146/100 (Up to &lt; 6000), Chapter 3.8 DD+DIS205.06E with Edition 1, Revision 16.</td>
<td></td>
</tr>
<tr>
<td></td>
<td>The two documents are now combined in this document with a new DD+DIS207.10E and Edition 1, Revision 0.</td>
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</tr>
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Referenced Documents

<table>
<thead>
<tr>
<th>Document</th>
<th>Title</th>
</tr>
</thead>
<tbody>
<tr>
<td>DD+DIS233.08E</td>
<td>CR Mammography Solution, Service Bulletin No. 37</td>
</tr>
</tbody>
</table>
WARNING:
Improper operation or service activities may cause damage or injuries.

INSTRUCTION:
(1) Read the "Generic Safety Directions" document (see MEDNET GSO => General Info => Agfa HealthCare => Publications => Service Manual) prior to attempting any operation, repair or maintenance task on the equipment.
(2) Strictly observe all safety directions within the "Generic Safety Directions" and on the product.

NOTE:
To verify the latest version of single documents and of Service Manuals refer to the Document Type 'Order List' in the GSO library.
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<tr>
<td>CR 85-X Type 5148 / 100 as of SN 5111</td>
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<tr>
<td>CR 75.0 Type 5146 / 100, 101, 105, 200, 201 are already out of production.</td>
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<td>Availability</td>
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<tr>
<td></td>
<td>- &lt;Computed Radiography =&gt; CR Digitizers =&gt; CR 85-X =&gt; Freeware&gt;</td>
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<td>- &lt;Computed Radiography =&gt; CR Digitizers =&gt; CR 75.0 =&gt; Freeware&gt;</td>
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<tr>
<td>Prerequisites</td>
<td>The new Software is upgradeable from every previous version of ACP_XXXX Software.</td>
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</table>

1.1 New Features of Digitizer Software ACP_5103 since Software Version ACP_5102

Software change to support the new Hamamatsu Photomultiplier. The software ACP_5103 supports the use of the new Hamamatsu Photomultiplier as well as the existing Photonis photomultiplier.

1.2 Changes in Service and Customer functionality since Software Version ACP_5102

No changes in this version.

1.3 Solved Bugs with Software Version ACP_5103

Software was adapted in order to avoid issues during the sensitivity adjustment done in the production line.
2 Release Info for Digitizer Software ACP_5102

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<td>• CR 85-X Type 5148 / 100 as of SN 4067</td>
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<tr>
<td>Prerequisites</td>
<td>The new Software is upgradeable from every previous version of ACP_XXXX Software.</td>
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</tbody>
</table>

2.1 New Features of Digitizer Software ACP_5102 since Software Version ACP_5007

- Handling of cassettes for mammography applications improved:
  Mammography cassettes will be turned opened, if image plate is obtained.
- Support of new CR Mammography cassettes.
  For more information refer to the CR Mammography Solution Service Bulletin No. 37, DD+DIS233.08E.

2.2 Changes in Service and Customer functionality since Software Version ACP_5007

No changes in this version.
2.3 Solved Bugs with Software Version ACP_5102

- Mammo cassettes are not closed while turning the cassette module with the empty cassette. This prevents possible damage of the fleece of the new type of Mammography cassettes.
- In the screen which is displayed after a shading calibration failed, was no option to skip this menu. Now the `<Chancel>` bottom is available to skip this screen.
3 Release Info for Digitizer Software ACP_5007

<table>
<thead>
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</tr>
<tr>
<td>Prerequisites</td>
<td>The new Software is upgradeable from every previous version of ACP_XXXX Software.</td>
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</tbody>
</table>

3.1 New Features of Digitizer Software ACP_5007 since Software Version ACP_4007

- Support of the new revive-racks for CR 85-X with USB interface instead of floppy disk drive.
- HQ_0511110001: Improved handling of RF-Tags. The software will not write anymore data in protected sectors of the RF-Tag.
- New screens of the shading calibration are translated in the different languages (Version ACPL5007 of the language floppy).
- New version of operating system “portex 2006.02”

3.2 Changes in Customer Functionality since Software Version ACP_4007

- Modified menu:
  - Specific terms like “floppy” are replaced by e.g. “storage medium”.
  - New version of language files
3.3 Changes in Service Functionality since Software Version ACP_4007

- Support of the new revive-racks for CR 85-X with USB interface instead of floppy disk drive.
- Modified calibration procedure:
  - IP-Center and Shading calibration is also possible with cassettes exposed on mammography X-ray modalities.
- Modified user interface (Service Menu):
  - Service menus for calibrations are adapted to the menus of CR 25.0 / CR 35-X.
  - Improved shading calibration screens
  - New version of language files
  - Specific terms like “floppy” are replaced by e.g. “storage medium” or “data”.

3.4 Solved Bugs with Software Version ACP_5007

- Setting for the mammography-option is no more changed when installing a CPF-File (Customer Parameter File).
- Adaptation of the web interface. The correct device-type will be shown from now on.
- Improved network connectivity: If the network connection is lost, the image will be sent once the network is connected again.
CR 85-X  
Type 5148/100  

CR 75.0  
Type 5146/105  
(as of SN ≥ 6000)

Chapter 3.9 is not applicable and therefore intentionally left blank.
Purpose of this document

This document contains:

- reference diagrams for identification and location of assemblies inside the machine including an alphanumeric reference list
- block diagrams and overall diagrams
- circuit diagrams of printed circuit boards, if necessary

Document History

<table>
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<th>Edition</th>
<th>Release Date</th>
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<td>2.0</td>
<td>02-2007</td>
<td>Only layout changes as this Service Documentation is also valid for CR 75.0 Type 5146/105 (as of SN ≥ 6000).</td>
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Referenced Documents

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<tr>
<th>Document</th>
<th>Title</th>
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<tr>
<td>Service Bulletin</td>
<td>CR 75.0 Type 5146/105 (as of SN ≥ 6000) introduced, DD+DIS028.07E</td>
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WARNING:
Improper operation or service activities may cause damage or injuries.

INSTRUCTION:
(1) Read the "Generic Safety Directions" document (see MEDNET GSO => General Info => Agfa HealthCare => Publications => Service Manual) prior to attempting any operation, repair or maintenance task on the equipment.
(2) Strictly observe all safety directions within the "Generic Safety Directions" and on the product.
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A Identification Diagrams

1 Units of the Digitizer (Overview)

100 Frame / Rotation Unit

200 Cassette Unit 1 / Cassette Unit 2

300 cPCI Rack

400 IP Transport Units
    Prescan / Postscan

500 Inputbuffer / Outputbuffer

600 Optic Module

700 Erasure Unit
2 Frame / Rotation Unit (Assembly No. 100)

2.1 Diagram
### Table of Components

<table>
<thead>
<tr>
<th>Ass.</th>
<th>Abbreviation</th>
<th>Designation (also used by Diagnosis Mode)</th>
<th>Function</th>
<th>Circuit Diagram Page/Coord.</th>
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<tbody>
<tr>
<td>100</td>
<td>GS202</td>
<td>ROTATION-BD</td>
<td>Rotation unit stepper motor control board</td>
<td>2/C1–E1</td>
</tr>
<tr>
<td>100</td>
<td>GS204</td>
<td>ROT-WORKPOS-LS</td>
<td>Rotation unit work position (light barrier)</td>
<td>2/F1</td>
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<tr>
<td>100</td>
<td>GS206</td>
<td>ROTAT-O-POS-LS</td>
<td>Rotation unit home-position (light barrier)</td>
<td>2/F1</td>
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<tr>
<td>100</td>
<td>MC101</td>
<td>LINE-FILTER</td>
<td>2-phase line filter for power supply</td>
<td>1/A6–B6</td>
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<tr>
<td>100</td>
<td>M212</td>
<td>ROTATION DRIVE</td>
<td>Motor for rotation unit</td>
<td>2/B1</td>
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<tr>
<td>300</td>
<td>GS314</td>
<td>IOBUS-DISTRIB. (see pages 14/15)</td>
<td>I/O-BUS distributor board</td>
<td>3/G5–G6</td>
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<td>300</td>
<td>ST319</td>
<td>ETHERNET (see pages 14/15)</td>
<td>Ethernet connector</td>
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3 Power Unit (Assembly No. 100)
3.1 Diagram
## 3.2 Table of Components

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→M-S_Board on circuit diagram page 1, coord.B/C1 – B/C4

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<tr>
<td>100</td>
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4 Cassette Module 1 (Assembly No. 200)

4.1 Diagram
### 4.2 Table of Components

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<td>M201</td>
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<td>Cassette Module 1: Lift Motor</td>
<td>2/C2–C3</td>
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<td>Cassette Module 1: Clamp Motor</td>
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<td>Cassette Module 1: Opener Motor</td>
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<td>Cassette Module 1: Belt Motor</td>
<td>2/D2–D3</td>
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<tr>
<td>200</td>
<td>GS210</td>
<td>5FOLD-ST-CASS1</td>
<td>Cassette Module 1: 5fold stepper motor board</td>
<td>2/B4–E5</td>
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<td>Cassette Module 1: Lift-homeposition (light barrier)</td>
<td>2/D6</td>
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<td>Cassette Module 1: Cassette Detection (light barrier)</td>
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<td>Cassette Module 1: Clamp-position (light barrier)</td>
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5  Cassette Module 2 (Assembly No. 200)

5.1  Diagram
### 5.2 Table of Components

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<tr>
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<td>2/H6</td>
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<td>GS266</td>
<td>CASS2-IN-DET-LS (receiver) CASS2-BELT-O-LS</td>
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<td>GS278</td>
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**DOCUMENT CONTROL NOTE:**
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6 cPCI – Rack (Assembly No. 300)

6.1 Diagram

![Diagram of cPCI rack assembly](image-url)
# 6.2 Table of Components

<table>
<thead>
<tr>
<th>Ass.</th>
<th>Abbreviation</th>
<th>Designation (also used by diagnosis Mode)</th>
<th>Function</th>
<th>Circuit Diagram Page/Coord.</th>
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<td>cPCI-Rack: Harddisk drive</td>
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<td>cPCI-Rack: Floppy drive</td>
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<td>cPCI-Rack: Power unit</td>
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<td>Scan Master Board</td>
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<td>IOBUS-DISTRIBUTOR</td>
<td>I/O-BUS distributor board</td>
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<td>ST319</td>
<td>ETHERNET</td>
<td>Ethernet connectors</td>
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<td>700</td>
<td>M701</td>
<td>ERASURE-UNIT-FAN (see pages 30/31)</td>
<td>Erasure Unit Fan</td>
<td>7/E2–F2</td>
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7 IP – Transport Unit Prescan (Assembly 400)
7.1 Diagram
### 7.2 Table of Components

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<th>Designation (also used by diagnosis Mode)</th>
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<th>Circuit Diagram Page/Coord.</th>
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<tr>
<td>400</td>
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<td>PRE-SUCT-DRIVE</td>
<td>Prescan suction motor</td>
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<td>M403</td>
<td>PRE-SLED-DRIVE</td>
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<td>Solenoid valve - prescan</td>
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<td>GS420</td>
<td>PUMP-PRESCL</td>
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<td>Suction position – prescan (light barrier)</td>
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<td>Robot - workposition – prescan (light barrier)</td>
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<td>GS434</td>
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<td>Prescan robot board</td>
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8 IP – Transport Unit Postscan (Assembly 400)

8.1 Diagram
## Table of Components

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<td>POINDS-MG-LEFT</td>
<td>Solenoid valve for parking position robot - left</td>
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<td>MG402</td>
<td>POINDS-MG-RIGHT</td>
<td>Solenoid valve for parking position robot - right</td>
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<td>MG411</td>
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<td>Solenoid valve – postscan</td>
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<td>Vacuum Pump - postscan</td>
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<td>Parking position for robot – left (light barrier)</td>
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9 Input Buffer (Assembly 500)

9.1 Diagram
### 9.2 Table of Components

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<td>Input buffer door motor</td>
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<td>Input buffer belt motor</td>
<td>5/D3</td>
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<tr>
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<td>Input buffer belt board</td>
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<tr>
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<td>INBUFF-CASS-DET</td>
<td>Input buffer cassette detection board</td>
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<td>INBUFF-CASS-DET (receiver)</td>
<td>Input buffer cassette detection (light barrier)</td>
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<tr>
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<td>RF-tag antenna</td>
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<td>CASS-DOT-DET</td>
<td>Cassette Dot Detection (to recognize ADC cassettes)</td>
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10 Output Buffer (Assembly 500)

10.1 Diagram
### 10.2 Table of Components

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<td>OUTB-ROLL-DRV</td>
<td>Output buffer roller drive motor</td>
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<td>Output buffer push drive motor</td>
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<td>GS552</td>
<td>OUTBUFF-PUSH-BD</td>
<td>Output buffer push board</td>
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<td>GS554</td>
<td>OUTBUFF-PUSH-LS</td>
<td>Output buffer push position (light barrier)</td>
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<td>GS556</td>
<td>OUTBUFF-ROLL-BD</td>
<td>Output buffer roller board</td>
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<tr>
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<td>Output buffer cassette Detection board</td>
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<tr>
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<td>GS562</td>
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<td>Output buffer cassette detection (light barrier)</td>
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<td>500</td>
<td>GS564</td>
<td>OUTBUFF-ROLL-LS</td>
<td>Output buffer roller position (light barrier)</td>
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11 Operation Terminal (Assembly 500)

11.1 Diagram
### 11.2 Table of Components

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<td>500</td>
<td>GS566</td>
<td>LCD-TERMINAL-BD</td>
<td>LCD-Terminal Board</td>
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<td>500</td>
<td>GS568</td>
<td>DISPLAY-LCD-MOD</td>
<td>Display LCD Module</td>
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<tr>
<td>500</td>
<td>GS570</td>
<td>FLACHKEYBOARD</td>
<td>Keyboard</td>
<td>5/A1–B1</td>
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12 Optic Module – Top View (Assembly 600)

12.1 Diagram
## 12.2 Table of Components

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<td>600</td>
<td>M702</td>
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<td>Slowscan drive motor</td>
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<td>POST-ALIGN-DRV</td>
<td>Postscan alignment drive motor</td>
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<td>PRE-ALIGN-DRV</td>
<td>Prescan alignment drive motor</td>
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<tr>
<td>600</td>
<td>GS610</td>
<td>5FOLD-ST-SCAN</td>
<td>5fold stepper motor board of scan unit</td>
<td>6/D3–H3</td>
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<tr>
<td>600</td>
<td>GS612</td>
<td>POST-ALIGN-LS</td>
<td>Postscan alignment position (light barrier)</td>
<td>6/D4–E4</td>
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<tr>
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<td>GS616</td>
<td>PRE-ALIGN-LS</td>
<td>Prescan alignment position (light barrier)</td>
<td>6/H4</td>
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<tr>
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<td>GS620</td>
<td>OPTIC MODUL</td>
<td>Optic Module</td>
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<td>GS622</td>
<td>PM-TUBE</td>
<td>Photomultiplier Tube</td>
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13 Optic Module – Bottom View (Assembly 600)

13.1 Diagram
13.2 Table of Components

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<td>ROLL-LIFT-DRV</td>
<td>Scan roller lift drive motor</td>
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<tr>
<td>600</td>
<td>GS614</td>
<td>POST-IP-DET-LS</td>
<td>Postscan IP-detection (light barrier)</td>
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<tr>
<td>600</td>
<td>GS618</td>
<td>ROLLER-LIFT-LS</td>
<td>Roller-Lift-Pos (Gap light barrier)</td>
<td>6/H4</td>
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<tr>
<td>600</td>
<td>GS626</td>
<td>BEGIN-O-SCAN-LS (transmitter)</td>
<td>Begin of scan position (light barrier)</td>
<td>6/F4</td>
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<tr>
<td>600</td>
<td>GS628</td>
<td>BEGIN-O-SCAN-LS (receiver)</td>
<td>Begin of scan position (light barrier)</td>
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14 Erasure Unit (Assembly 700)

14.1 Diagram
### 14.2 Table of Components

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<td>----- ERASURE-UNIT-FAN (see pages 14/15)</td>
<td>Lamps of the erasure unit</td>
<td>7/E5–H5</td>
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<tr>
<td>700</td>
<td>M701</td>
<td>Erasure Unit Fan</td>
<td>Erasure Unit Fan</td>
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### B Circuit Diagrams of
CR 85-X (CR 75.0 Type 5146/105) Digitizer

**Overview of Circuit Diagrams F1.5148.4003.0**

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<th>Sheet Name</th>
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<td>(6)</td>
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<td>(7)</td>
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The Circuit Diagrams (Sheets 1-7) can be found on the following pages.
Manufacturer
Agfa HealthCare N.V

Published by
Agfa-Gevaert HealthCare GmbH
Tegernseer Landstraße 161
D - 81539 München
Germany

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WARNING:
Improper operation or service activities may cause damage or injuries.

INSTRUCTION:
(1) Read the "Generic Safety Directions" document
(see MEDNET GSO => General Info => Agfa HealthCare => Publications =>
Service Manual) prior to attempting any operation, repair or maintenance task on
the equipment.
(2) Strictly observe all safety directions within the "Generic Safety Directions" and on
the product.

WARNING:
Hazards may be introduced because of component failure or improper
operation.

INSTRUCTION:
• Replace defective parts with Agfa HealthCare original spare parts.
• Use only tools and measuring instruments which are suitable for the procedure.
• Only approved Agfa HealthCare accessories must be used. For a list of
compatible accessories contact your local Agfa HealthCare organization or

NOTE:
To verify the latest version of single documents and of Service Manuals refer to the
Document Type ‘Order List’ in the GSO Library.
Document History

<table>
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<th>Edition, Revision</th>
<th>Release Date</th>
<th>Changes compared to previous Version 2.1</th>
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<td>Index of Spare Parts Numbers updated. “Terminal Board (GS566)”, “Display board (GS568)” added, see section “Paneling, Mounting Rack”. “Ethernet Cable (ST319)” added, see section “Mounting Rack, Frame”. “Interlock bracket” reworked, see section “Door LHS”. “CPCI Rack complete”, “CPCI Rack populated” deleted, “Power supply (GS306)” reworked, see section “CPCI Rack”. Revive -rack, -power supply, -board, fan bracket reworked, see section “Revive Rack”, “Foam gasket” added, see section “Erasure Unit”, “PMT detector” reworked, “Plastic Cover” added, see section “Scan Module”. Order Numbers of Kits added, see section “Accessories”</td>
</tr>
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NOTE:
Agfa reserves the right to deliver compatible parts or alternative parts. Prices to the original order may differ.

Contact

Spare Parts ordering
Europe orderprocessing-europe.matrium@eads.com
Overseas orderprocessing-overseas.matrium@eads.com

Spare Parts returns
Worldwide returns.matrium@eads.com

NOTE:
For Recycling Information please refer to:

http://intra.agfanet/cd/ep/ehs.nsf
How to navigate the Spare Parts List online with the Acrobat Reader

(1) Open Bookmarks.
(2) Click on "CONTENTS".

(3) See overview of the modules.
(4) Click on requested module.

(5) Appropriate page opens.

(6) Click on green arrow to navigate back to the overview of the modules.
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MOTOR BRACKET ASSY  
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(M515) |         |          |           |                                 |
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(GS564)  
LIGHT BARRIER  
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BARRIERE LUMINEUSE  
(GS564) |         |          |           |                                 |
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- = Assembly
= Standard part. For order please refer to the separate spare parts list for standard parts "DD+DIS011.93M".
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### Spare Parts List

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CASSETTE PART, CHASSIS - PART 5

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Standard part symbol: = Standard part. For order please refer to the separate spare parts list for standard parts "DD+DIS011.93M".  
Spare part symbol: *= Spare part standardly is not kept in stock, extended delivery time is possible.  
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CASSETTE PART, CHASSIS - PART 6

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## Spare Parts List

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CR85-X
Type 5148/100 (up to SN <4000)
CR75.0
Type 5146/101
Type 5144/105 (up to SN <6500)
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- **CM+9514614250**: LÜFTER VERDR, PCI-RACK 250MM - (M300)
- **CM+9048613570**: SCSI ULTRA 3 TERMINATOR
- **CM+9514614402**: EINSCHUB STORAGE KOMPLETT - (GS302, GS304)
- **CM+9048613651**: DISKETTENLAUFWERK 3,5"
- **CM+9048613540**: FESTPLATTE
- **CM+9514818500**: REVIVE POWER SUPPLY (GS306)
- **CM+9514614653**: EINSCHUB IO-MASTER - (GS310)
- **CM+9514615014**: OBERON 3 PCB - (GS312)
- **CM+9048613420**: CPCI BACKPLANE 3 SLOT - (GS300)

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CR 75.0 / CR 85-X

07-2010

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**Spare Parts List**

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**Notes:**
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  + = Standard part. For order please refer to the separate spare parts list for standard parts "DD+DIS011.93M".
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---

**REVIVE RACK**

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07-2010

Type 5146/105, 5148/100

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DOOR RHS, POWER UNIT - PART 2
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<th>Description</th>
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IP TRANSPORT, OUTPUT - PART 2

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07-2010
CR 75.0 / CR 85-X
Type 5146/101/105, 5148/100
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ONLY FOR DEVICES WHICH ARE LOCATED HIGHER THAN 2000M ABOVE SEE LEVEL
(SEE SB DD+DIS276.07E)
## Spare Parts List

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IP TRANSPORT, INPUT - PART 2

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CR85-X
Type 5148/100
CR75.0
Type 5146/105 (as of SN 6000)
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**DD+DIS282.08M**

**CR85-X**
Type 5148/100
CR75.0
Type 5146/105 (as of SN 6000)

**SCAN MODULE - PART 1**

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**Edition 2, Revision 2**
07-2010

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CR75.0
Type 5146/101 (up to SN < 6000)
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- **DD+DIS282.08M**
- **CR75.0 Type 5146/101 (up to SN <6000)**

**SCAN MODULE - PART 1**

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**07-2010**
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Type 5148/100
CR75.0
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= Assembly  
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SCANT MODULE - PART 3

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Spare Parts List

Type 5146/101/105, 5148/100

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CR 75.0 / CR 85-X
Chapter 5 / 76
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**CASSETTE CR MD 4.0 10"X12" (TYPE 8308/780)**
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Spare Parts List

CASSETTE CR MD 4.0 15X30 (TYPE 8316/780)

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Edition 2, Revision 2
CR 75.0 / CR 85-X
07-2010
Type 5146/101/105, 5148/100

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CASSETTE CR MD 4.0 15X30 (TYPE 8316/780)
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= Assembly
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CASSETTE CR MD 4.0 21X43 (43X35 VERT.) (TYPE 8320/785)

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CR 75.0 / CR 85-X
Chapter 5 / 94
07-2010
Type 5146/101/105, 5148/100
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CASSETTE CR MM3.0 MAMMO 18X24 (TYPE 8330/785)
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**CASSETTE CR MM3.0 MAMMO 18X24 (TYPE 8330/785)**
### CASSETTE CR MM3.0 MAMMO 24X30 (TYPE 8331/785)

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| 12       | CM+9833110113 | SCHARNIER HINGE CHARNIÈRE | | CM+9833110113 | SCHARNIER HINGE CHARNIÈRE |
| 13       | CM+9830011310 | ALULABEL (FILMERKENNUNG) ALU LABELE (FILM DETECTION) ETIQUETTE ALU (DETECTION DE FILM) | | CM+9830011310 | ALULABEL (FILMERKENNUNG) ALU LABELE (FILM DETECTION) ETIQUETTE ALU (DETECTION DE FILM) |
| 14       | CM+9830010440 | SCHRAUBE SCREW VIS | | CM+9830010440 | SCHRAUBE SCREW VIS |
| 15       | CM+9833012200 | PUSHING FINGERS PUSHING FINGERS PUSHING FINGERS | | CM+9833012200 | PUSHING FINGERS PUSHING FINGERS PUSHING FINGERS |
| 16       | CM+9833060600 | DECKELFEDER UND RÜCKHALTER DECKELFEDER UND RÜCKHALTER DECKELFEDER UND RÜCKHALTER | | CM+9833060600 | DECKELFEDER UND RÜCKHALTER DECKELFEDER UND RÜCKHALTER |

**DOCUMENT CONTROL NOTE:**
The controlled version of this document resides on MedNet. Any printed copy of this document is uncontrolled.

**Edition 2, Revision 2**
CR 75.0 / CR 85-X
07-2010
Type 5146/101/105, 5148/100

**Agfa Company Confidential**
**Spare Parts Kit Categories**

R  'Repair'  **Parts required to repair a machine**  
Kit ‘R’ should be part of the field service engineers’ car stock.  
Quantity covers requirements for ca. 10 machines.  

Adapt quantity locally depending on:  
- Number of machines  
- Extension of the service area  
- Local service structure (centralized / decentralized)  
- Stockpilling  

I  'Installation'  **Parts required to install a machine**  
Kit ‘I’ should be available as case stock.  
Includes all parts to perform the installation (does not comprise parts included in the shipment).  
Quantity covers one single machine installation.  

M  'Maintenance'  **Parts required to maintain a machine**  
Kit ‘M’ should be available as case stock.  
Includes all parts required to perform a maintenance according to the maintenance checklist.  
Quantity covers one single maintenance.  

L  'Local stock'  **Extremely expensive or bulky parts**  
Kit ‘L’ should be part of the local central warehouse.  
Determine quantity depending on costs and on the installed base.  

**Spare Parts Kit Order Numbers**

<table>
<thead>
<tr>
<th>Order Number</th>
<th>Spare Part Kit</th>
<th>Version</th>
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</thead>
<tbody>
<tr>
<td>CM+9514885100</td>
<td>REPAIR KIT</td>
<td>2</td>
</tr>
<tr>
<td>CM+9514885200</td>
<td>LOCAL KIT</td>
<td>2</td>
</tr>
<tr>
<td>CM+9514885301</td>
<td>MAINTENANCE KIT</td>
<td>2</td>
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Type Overview

This spare parts list is valid for the following machine type(s):

<table>
<thead>
<tr>
<th>Device Name</th>
<th>Type Number</th>
<th>Specification</th>
</tr>
</thead>
<tbody>
<tr>
<td>CR 75.0 DIGITIZER</td>
<td>5146/0101</td>
<td>EOSTJ</td>
</tr>
<tr>
<td>CR 75.0</td>
<td>5146/0105</td>
<td>---</td>
</tr>
<tr>
<td>CR85-X</td>
<td>5148/0100</td>
<td>ES74S</td>
</tr>
</tbody>
</table>

Accessory Overview

Following accessories are separately available:

<table>
<thead>
<tr>
<th>Accessory</th>
<th>Order Number</th>
</tr>
</thead>
<tbody>
<tr>
<td>PROSAT WIPERS</td>
<td>ETRTM</td>
</tr>
<tr>
<td>PROSAT WIPERS</td>
<td>10+9999912190</td>
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</tbody>
</table>
Purpose of this Document

This document describes:

- The Safety Directions for the CR User Station (CRUS)
- How to install the CR User Station
- The basic functionality of the CRUS
- Other Service aspects, e.g. Installation Planning

Document History

<table>
<thead>
<tr>
<th>Edition. Revision</th>
<th>Release Date</th>
<th>Changes compared to previous version 4.0</th>
</tr>
</thead>
<tbody>
<tr>
<td>4.1</td>
<td>12-2010</td>
<td>- Added digitizers CR 35-X and CR 85-X as supported devices. See section 1.</td>
</tr>
<tr>
<td></td>
<td></td>
<td>- Updated installation instructions with regard to USB connection of ID-Tablet. See section 3.5.</td>
</tr>
<tr>
<td></td>
<td></td>
<td>- Applied new document template.</td>
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</table>

Referenced Documents

<table>
<thead>
<tr>
<th>Document</th>
<th>Title</th>
</tr>
</thead>
<tbody>
<tr>
<td>Not applicable</td>
<td></td>
</tr>
</tbody>
</table>
WARNING:
Improper operation or service activities may cause damage or injuries.

INSTRUCTION:
(1) Read the “Generic Safety Directions” document (see MEDNET GSO => General Info => Agfa HealthCare => Publications => Service Manual) prior to attempting any operation, repair or maintenance task on the equipment.

(2) Strictly observe all safety directions within the “Generic Safety Directions” and on the product.
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## INSTALLATION PLANNING

<table>
<thead>
<tr>
<th>Section</th>
<th>Description</th>
</tr>
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<tbody>
<tr>
<td>8.1</td>
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</tr>
<tr>
<td>8.1.1</td>
<td>CR User Station stand-alone</td>
</tr>
<tr>
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<td>CR User Station with CR 25.0/CR 35-X</td>
</tr>
<tr>
<td>8.2</td>
<td>CR User Station with CR 75.0/CR 85-X</td>
</tr>
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<td>8.3</td>
<td>Technical Data</td>
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<tr>
<td>8.4</td>
<td>Connections</td>
</tr>
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<td>Mains Fuse Protection</td>
</tr>
<tr>
<td>8.4.2</td>
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</tr>
<tr>
<td>8.4.3</td>
<td>Connection Cables</td>
</tr>
</tbody>
</table>
1 Introduction

The CR User Station (CRUS) is an operating console that facilitates the work of the radiographer. It is suitable for all CR environments: centralized, decentralized or personal CR solutions.

It has been designed in line with the look and feel of the range of the new generation digitizers, combining with the digitizers to form a “whole”. It provides a professional way of delivering an integrated solution for computer equipment in Agfa’s CR offering.

Its modular ergonomic design offers space for:
- Workstation for image handling, processing and dispatching,
- LCD flat-screen monitor
- Network switch, mouse, keyboard
- Uninterruptible Power Supply (UPS)
- Cassette storage

The CRUS can be installed as a stand-alone configuration, working together with a CR 25.0/CR35-X or CR 75.0/CR85-X digitizer.

For an optimal workflow the CRUS can also be docked directly to CR 25.0 / CR 35-X. The CRUS can not be docked directly to CR 75.0 / CR 85-X.
This documentation includes the mechanical installation, power selection, technical data and connections of the CRUS. A short functional description, with an overview of the components is also included in this Service Documentation. As the CRUS is maintenance-free, there are no maintenance instructions or checklists available.

NOTE:

- For all required information concerning digitizers, where the CRUS is attached to, please refer to the relevant Service Documentation:
  - CR 25.0: DD+DIS071.04E
  - CR 35-X: DD+DIS219.06E
  - CR 75.0: DD+DIS002.04E
  - CR 85-X DD+DIS378.05E

The scope of delivery of the CRUS comprises:

- Furniture
- Isolating transformer
- ID Tablet
- Accessories Kit
2 Safety Instructions

2.1 General Safety Instructions

- The CRUS complies with the EN 60950 standard for Information Technology. This means that, although it is absolutely safe, patients may not come in direct contact with the equipment. Therefore, the operator console must be placed outside a radius of 1.5 m around the patient.

- Perform no other operations on the CRUS than those described in this document.

- Pay attention when working near the pedestal: the foot projects slightly and could be tripped on. When rolling the pedestal away from its position, take care not to pull or put any strain on power or network leads.

- When moving the CRUS, take care that it remains stable at all times. In particular, the following considerations should be kept in mind:
  - The nature of the floor and any floor-coverings, carpets, etc
  - Any obstructions such as cables
  - Any slopes to be negotiated

- To avoid collisions and instability the monitor must be turned over the ID Tablet when moving longer distances, as shown below:

```
Figure 2
```

- Make sure that the two safety caps are mounted on top of the right side rollers in case of stand-alone CRUS (this means that the CRUS is not connected to a CR 25.0/CR 35-X Digitizer), as shown below.

```
Figure 3
```
2.2 Safety Precautions for the Monitor

- The monitor must be fixed on the monitor arm with screws.
- If the monitor arm is re-positioned in a different height, the lock must be closed.

2.3 Safety Instructions for Cleaning the CR User Station

Pull the power plug out of the CRUS prior to cleaning the equipment and switch off the UPS (Uninterruptible Power Supply) if installed.

2.4 Relevant Warning Label

Pay attention to the warning label at the rear side of the CRUS:

Check power selection before connecting to mains

![Figure 4](image)
2.5 Safety Compliance

The CRUS complies with:

- The general safety regulations EN 60950, EN 60601-1-2, and UL 60950
- CSA C22.2 No. 60950
- The radio interference regulations EN 55022:1997, Class B and FCC 47, Part 15, Subchapter B, Class A

The safety compliance is only guaranteed by using equipment supplied by Agfa (refer to ‘Technical specifications’ on page 21 of the User Manual 2313). Using other equipment will void the safety compliance.

In combination with a digitizer the isolating transformer assures that the digitizer still complies with EN 60601-1-1 medical, electrical systems.

The CR User Station bears the CE mark and fully complies with the CE Directive 89/336/EEC and with the federal code of the United States, bearing on:

- Emission and immunity according to EN 60601-1-2, for emissions the equipment complies with EN 55011 class A (CISPR 11). This is a Class A product. In a domestic environment this product may cause radio interference in which case the user may be required to take adequate measures.
- Emissions according to 47 CFR part 15 subpart B, Class A. This equipment has been tested and found to comply with the limits for a Class A digital device, pursuant to part 15 of the FCC Rules. These limits are designed to provide reasonable protection against harmful interference when the equipment is operated in a commercial environment. This equipment generates, uses, and can radiate radio frequency energy and, if not installed and used in accordance with the instruction manual, may cause harmful interference to radio communications. Operation of this equipment in a residential area is likely to cause harmful interference in which case the user will be required to correct the interference at his own expense.
- Radio-parameters of the ID Tablet according to ETS 300330.

The ID Tablet complies with:

- UL 60950, Third Edition,
- CAN/CSA 22.2 No. 60950, Third Edition (cUL),
- EN 60950 1:2001 TÜV certified.
3 Installation Instructions

3.1 Mounting to the Base Plate

NOTE:
The actions described in this section apply only, if the CRUS is installed as stand-alone device. Skip this section if you want to dock it to a CR 25.0 / CR 35-X digitizer.

(1) Put base plate on the ground at the final position of the CRUS.

(2) Move the unequipped CRUS onto it.

(3) Screw four Phillips screws slightly to the thread nuts of the base plate. Attend that the base plate does not bend up by tightening the screws.

(4) Mount safety caps on top of the right side rollers.
3.2 Removing the ID Tablet from the CR User Station

(1) Loosen the Phillips screw (see circle).

(2) Pull the ID Tablet to the front and lift it off carefully (see arrow).

(3) Unplug the power supply and the connection to the control PC.

![Figure 8](image)

3.3 Installing Hub and Uninterruptible Power Supply (UPS)

(1) Unscrew the two grids at the rear side of the CRUS.

(2) Insert the hub (A) from above between the brackets at the rear wall.

(3) Pass the mains cable of the hub through the cut of the front bracket (B), plug it in the hub and fix the bracket with two screws (5.5 mm, C).

(4) Insert the UPS

(5) Plug in the power cable of the UPS to the isolating transformer.

(6) Connect the power cables of control PC and monitor to the UPS.

(7) Push the feet of the UPS in the four borings at the bottom (arrows; the fourth boring is hidden by the UPS).

![Figure 9](image)

![Figure 10](image)
(8) Apply foam to the bracket (Figure 11).

Figure 11

(9) Fix it with four screws to the furniture (Figure 12).

Figure 12

Result  Hub and UPS are installed in the CRUS.
3.4 Installing Monitor, Keyboard and Mouse

(1) Insert the monitor arm (A) in the socket (B) and fix it with the Allen screw (C, 5 mm) at the desired height.

![Figure 13](image13.png)

NOTE:
By default, a rack for the Barco monitor is installed.
If you have a Barco monitor, go directly to step (2).
If you have another monitor, exchange the rack before proceeding with step (2). The exchange of the rack for the NEC monitor is described in section 3.9.

(2) Unpack the monitor and fix it to the monitor rack with screws (see arrows).

![Figure 14](image14.png)

NOTE:
Figure 14 is an example. Installations of other monitors, e.g. with adapter plates, may look different.

(3) Adjust the monitor according to section 3.10.
(4) Put keyboard and mouse into their predefined position.

Figure 15

(5) Unscrew the cable duct at the monitor arm (two Phillips screws).

(6) Pass the cable in the duct and close it.

(7) Place the monitor adapter beside the UPS and connect it to the monitor and the power supply.

(8) Install other cables as usual with PC installations. Pass the cables accurately in the provided cable ducts.

Figure 16

Result Monitor, Keyboard and Mouse are installed in the CRUS.
3.5 **Re-Installing the ID Tablet**

(1) Put the ID-Tablet back to its place and fix the Phillips screw (see Figure 8, page 11).

(2) Connect the USB cable coming from the ID-Tablet to a free USB port of the PC.

(3) Fix the two cassette brackets beneath the ID-Tablet.

![Figure 17](image-url)
3.6 Selecting Power Settings

(1) You find the possible primary voltages with the corresponding currents for the fuses at the rear side of the CRUS:

- 100 V: 6.3 AT
- 120 V: 5.0 AT
- 230 V: 2.5 AT
- 240 V: 2.5 AT

Figure 18

(2) Take out the plastic bushing above the power socket.

Figure 19

(3) Check that both fuses have current values which fit the local mains voltage.

If fuses must be changed, take the appropriate fuses from the accessory pack.

Figure 20
(4) Take out the adjustment element and insert it with the country-specific voltage at the left side (230 V in the example).

Figure 21

(5) Check that the correct mains voltage is visible in the small window of the plastic bushing (230 V in the example).

Figure 22

(6) Put the plastic bushing back.

Result

The power settings are adjusted.

3.7 Connections and Grids

(1) Connect the network cable of the digitizer to the hub of the CRUS.

(2) Connect the CRUS to the hospital network.

(3) Reinstall both rear grids.

NOTE:
If you want to dock the CRUS to a CR 25.0 digitizer, continue with section 3.8.

Result

The installation of the CRUS as a stand-alone device is finished. Connect it to the mains.
3.8 Docking the CRUS to a CR 25.0 / CR35-X Digitizer

(1) Fix the sticky tape to the side panel facing the digitizer (arrows).

(2) Move the CRUS to its final position next to the digitizer.
(3) Position the attaching plate in such a way, that the axis of the wheel of the digitizer is caught.

Figure 25

(4) Swivel attaching plate by 90° and fasten two Phillips screws at the CRUS side panel. This connection prevents the CRUS from unintended moving.

Figure 26

(5) Turn the wheels of the CRUS inwards and lock the brakes.

Figure 27

(6) Place the side cover such that the cutout (see arrow) is on the upper side.

(7) Mount the side cover with two screws (7 mm, circles).

(8) Connect the CRUS to the mains.

Figure 28

Result The CRUS is installed and docked to the CR 25.0 / CR 35-X.
3.9 Exchanging the Monitor Rack (NEC monitors only)

- By default, the CRUS is equipped with the monitor rack for the Barco monitor (see Figure 29).
- If you have a NEC monitor, you will have to exchange the monitor rack. For this, follow the instructions in this section.

![Figure 29](image)

1. Unscrew the lever (Allen key, size 4) and remove it.

![Figure 30](image)

2. Unscrew the quick opening device with your hand.

![Figure 31](image)
NOTE:
The monitor rack, the bearing and the washers can easily fall down!
Be careful when removing the axis.

(3) Push the axis out of its bearing.

Figure 32

(4) Remove monitor rack, bearing and two washers from the retainer.

Figure 33

NOTE:
If the monitor rack is not fixed properly, it may tilt unwanted.
Check that the hole of the retainer (see circle) and the form of the axis fit smoothly together.

Figure 34

(5) Align the bearing with the NEC monitor rack.

Figure 36
(6) Fix the monitor rack with the axis on the retainer. The arrows indicate the places for the washers.

(7) Screw the quick opening device into the lever.

(8) Screw the quick opening device with the lever back onto the end of the axis.

Result The monitor rack is exchanged.
### 3.10 Adjusting the Monitor

Adjust the inclination of the monitor by using the lever at the rear side:

**NOTE:**

The lever is a quick-fix system: Its **fixed** or **loose** position can be changed when it is pulled (**lever free**, see Figure 40).

There is no need to open the Allen screw at the axis for the adjustment of the monitor.

1. Support the monitor by holding it at the bottom side.
2. Loosen lever by turning counterclockwise.
3. Adjust the inclination.
4. Fix the lever by turning clockwise.

**Result** The individual components of the CR User Station are ready for use now.
4 Functional Description

4.1 Components of the CR User Station

The CRUS consists of the following components:

- Operator console
- Isolating transformer
- Integrated ID Tablet
- Monitor arm
- Top storage rack for up to six cassettes
- Two side storage racks for up to five cassettes each

Optional components (*) are:

- PC /QS or NX workstation
- LCD flat screen monitor
- Mouse, keyboard
- Network switch or hub
- UPS
4.2 Standard Workflow with the CR User Station

Together with a digitizer the CRUS offers an optimum workflow:

- Up to five exposed cassettes are stored in the upper side storage racks (1).
- The exposed cassettes are then identified in the ID Tablet (2).
- The exposed and identified cassettes are inserted directly into the digitizer or, if the digitizer is busy, stored in the top storage rack (3).
- The scanned and erased cassettes waiting to be used again are stored in the lower side storage rack (4).
4.3 Direct ID Workflow with the CR User Station

In order to save time it is also possible to use the CRUS for Direct ID.

- For this an exposed but unidentified cassette is inserted into the digitizer.
- By entering the cassette, the digitizer reads the cassette information of the RF Tag and a communication to the CRUS is opened.
- The digitizer starts scanning the IP and sends an ID Data Request Message to the CRUS. On the monitor of the CRUS the ID window pops up and the ID data have to be entered.
- After the user completed the information at the CRUS, it is sent back to the digitizer. The communication channel is closed afterwards.

5 Troubleshooting

5.1 Isolating Transformer

**Symptom**
The secondary winding of the isolating transformer is without current.

**Defect**
Defective fuse

**Solution**
Check fuses and replace them if necessary.

Three fuses are installed at the isolating transformer in the CRUS:

1. Primary: 2 x e.g. 2.5AT/230 V (according to country specific voltage) inside the plastic bushing of the voltage adjustment
2. Secondary: 1 x 2.0A T / 500V inside the fuse box

Exchange fuses can be ordered as follows:
- 2.0AT – CM+9 0451 9609 0
- 2.5AT – CM+9 0451 9604 0
- 5.0AT – CM+9 0452 3188 0
- 6.3AT – CM+9 0452 3187 0

**WARNING:**

*Fire hazard:*
Only use fuses of the exact value and characteristics stated above.
5.2 ID Tablet

**Symptom**
ID Tablet does not work.

**Defect**
The main switch is in position off.

**Solution**
Check if the main switch of the ID Tablet lights green.

![Figure 44](image-url)
6  **Spare Parts List**

For the current Spare Parts List refer to MedNet GSO Library.

7  **Maintenance**

The CRUS is free of maintenance.

8  **Installation Planning**

The device is suitable for continuous operation.

8.1  **Dimensions**

8.1.1  **CR User Station stand-alone**

<p>| | |</p>
<table>
<thead>
<tr>
<th></th>
<th></th>
</tr>
</thead>
<tbody>
<tr>
<td>Height</td>
<td>1010 mm (39.8””)</td>
</tr>
<tr>
<td>Height with monitor arm and 19” monitor max.</td>
<td>1710 mm (67.3””)</td>
</tr>
<tr>
<td>Width without cassette rack</td>
<td>320 mm (12.6””)</td>
</tr>
<tr>
<td>Depth</td>
<td>650 mm (25.6””)</td>
</tr>
<tr>
<td>Footprint with racks: 530 x 650 mm</td>
<td></td>
</tr>
<tr>
<td></td>
<td>(20.9” x 25.6””)</td>
</tr>
<tr>
<td></td>
<td>without racks: 520 x 650 mm</td>
</tr>
</tbody>
</table>
|                                       | (20.5” x 25.6””)
8.1.2 CR User Station with CR 25.0/CR 35-X

Required free space for optimum operation (all dimensions in cm (inch)):

![Diagram](Figure 45)

8.2 CR User Station with CR 75.0/CR 85-X

Required free space for optimum operation (all dimensions in cm (inch)):

![Diagram](Figure 46)
## 8.3 Technical Data

| Weight                      | 53 kg (empty)  
|                            | Approx. 100 kg (fully equipped)  

| **Operating Conditions**   |  
| Temperature               | 10°C – 30°C  
| Change of temperature     | 0.5°C / min.  
| Humidity                  | 15% RH to 80% RH  

| **Specifications of the Isolating Transformer** |  
| Power input, switchable (primary winding)      | 100V AC / 120V AC / 230V AC / 240V AC  
| Power output (secondary winding)                | 230V AC  
| Dimensions                                      | 220 mm x 170 mm x 200 mm (8.7" x 6.7" x 7.9")  

| **Specifications of the Integrated ID Tablet**  |  
| input voltage                                 | 100 - 240V AC; 5 V DC  
| frequency                                      | 50 - 60 Hz  
| classification                                 | Class III  

| **Type Label**  
| The type label is at the rear side of the CRUS.  

![Figure 47](image_url)

![Figure 48](image_url)
8.4 Connections

8.4.1 Mains Fuse Protection

<table>
<thead>
<tr>
<th>CRUS</th>
<th>Primary:</th>
</tr>
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<tbody>
<tr>
<td>100 V</td>
<td>6.3 A, slow blow</td>
</tr>
<tr>
<td>120 V</td>
<td>5.0 A, slow blow</td>
</tr>
<tr>
<td>230 – 240 V</td>
<td>2.5 A, slow blow</td>
</tr>
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</table>

<table>
<thead>
<tr>
<th>CR 25.0</th>
<th>Operating voltage:</th>
</tr>
</thead>
<tbody>
<tr>
<td>230 V / 240 V + 10%</td>
<td></td>
</tr>
<tr>
<td>120 V + 10%</td>
<td></td>
</tr>
<tr>
<td>100 V + 10%</td>
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</tbody>
</table>

<table>
<thead>
<tr>
<th>Mains Fuse Protection</th>
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</tr>
</thead>
<tbody>
<tr>
<td>Europe</td>
<td>16 A, slow blow</td>
</tr>
<tr>
<td>USA &amp; Japan</td>
<td>15 A, slow blow</td>
</tr>
</tbody>
</table>

8.4.2 ID Tablet

The ID Tablet is delivered with an Agfa specific USB connector.

8.4.3 Connection Cables

The following cables are included as standard delivery.

<table>
<thead>
<tr>
<th>Connection cable</th>
<th>I-2500-S</th>
</tr>
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<tbody>
<tr>
<td>Connection cable</td>
<td>5-15P/IEC 320 C13</td>
</tr>
<tr>
<td>USB cable</td>
<td>Agfa specific USB connector</td>
</tr>
</tbody>
</table>

Local and International wiring regulations must be observed. Check all supplies and voltages, currents, trips and fuses with the hospital facilities department or their engineers.
WARNING:
Improper operation or service activities may cause damage or injuries.

INSTRUCTION:
(1) Read the "Generic Safety Directions" document
(see MEDNET GSO => General Info => Agfa HealthCare => Publications =>
Service Manual) prior to attempting any operation, repair or maintenance task on
the equipment.
(2) Strictly observe all safety directions within the "Generic Safety Directions" and on
the product.

WARNING:
Hazards may be introduced because of component failure or improper
operation.

INSTRUCTION:
• Replace defective parts with Agfa HealthCare original spare parts.
• Use only tools and measuring instruments which are suitable for the procedure.
• Only approved Agfa HealthCare accessories must be used. For a list of
compatible accessories contact your local Agfa HealthCare organization or

NOTE:
To verify the latest version of single documents and of Service Manuals refer to the
Document Type ‘Order List’ in the GSO Library.
Document History

<table>
<thead>
<tr>
<th>Edition, Revision</th>
<th>Release Date</th>
<th>Changes compared to previous Version 3.1</th>
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<tbody>
<tr>
<td>3.2</td>
<td>02-2011</td>
<td>New ID-Board instead of HF-Board and Digital Board (as of SN10.000)</td>
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</tbody>
</table>

NOTE:
Agfa reserves the right to deliver compatible parts or alternative parts. Prices to the original order may differ.

Contact

Spare Parts ordering

Europe       Orderprocessing-europe@matrium.net
Overseas     Orderprocessing-overseas@matrium.net

Spare Parts returns

Worldwide    Returns@matrium.net

NOTE:
Recycling of the electronic and electrical waste equipment will ensure safety of human health and the environment.
For information about electronic and electrical waste equipment disposal, recovery and collection points, please contact your local waste disposal service or producer / distributor of this equipment.
If your equipment contains removable batteries or accumulators please dispose of these separately according to local regulations.
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POWER UNIT
MODULE DE PUISSANCE
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ID STATION - AB FN 10,000
ID STATION - AS OF SN 10,000
ID STATION - A PARTIR DE NS 10,000
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GESTELL
FRAME
CHÂSSIS
PAGE 6 - 7

DOCUMENT CONTROL NOTE:
The controlled version of this document resides on MedNet. Any printed copy of this document is uncontrolled.

Edition 3, Revision 2
CR User Station
02-2011
Type 5157/100
Agfa Company Confidential
How to navigate the Spare Parts List online with the Acrobat Reader

(1) Open Bookmarks.
(2) Click on "CONTENTS".

(3) See overview of the modules.
(4) Click on requested module.

(5) Appropriate page opens.

(6) Click on green arrow to navigate back to the overview of the modules.
<table>
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<tr>
<th>Pos. Nr.</th>
<th>Item no.</th>
<th>Pos. no.</th>
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= Assembly
= Standard part. For order please refer to the separate spare parts list for standard parts "DD+DIS11.93M".
* = Spare part standardly is not kept in stock, extended delivery time is possible.
99 = Spare Part is not shown in Exploded Views.
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= Assembly
D = Standard part. For order please refer to the separate spare parts list for standard parts "DD+DIS180.05M".
* = Spare part standardly is not kept in stock, extended delivery time is possible.
99 = Spare Part is not shown in Exploded Views.
<table>
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<tr>
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* = Spare part standardly is not kept in stock, extended delivery time is possible.
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$\square$ = Assembly
$\square$ = Standard part. For order please refer to the separate spare parts list for standard parts "DD+DIS011.93M".
* = Spare part standardly is not kept in stock, extended delivery time is possible.
99 = Spare Part is not shown in Exploded Views.
Spare Parts Kit Categories

R  'Repair'  Parts required to repair a machine
Kit `R` should be part of the field service engineers’ car stock.
Quantity covers requirements for ca. 10 machines.

Adapt quantity locally depending on:

• Number of machines
• Extension of the service area
• Local service structure (centralized / decentralized)
• Stockpilling

I  'Installation'  Parts required to install a machine
Kit `I` should be available as case stock.
Includes all parts to perform the installation (does not comprise parts
included in the shipment).
Quantity covers one single machine installation.

M  'Maintenance'  Parts required to maintain a machine
Kit `M` should be available as case stock.
Includes all parts required to perform a maintenance according to the
maintenance checklist.
Quantity covers one single maintenance.

L  'Local stock'  Extremely expensive or bulky parts
Kit `L` should be part of the local central warehouse.
Determine quantity depending on costs and on the installed base.

Spare Parts Kit Order Numbers

• Not available
Type Overview

This spare parts list is valid for the following machine type(s):

<table>
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<tr>
<th>Device Name</th>
<th>Type Number</th>
<th>Specification</th>
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<tr>
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<td>EPDNP</td>
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<td>CR User Station</td>
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</table>

Accessory Overview

Following accessories are separately available:

- Not available
Installation Instructions for Digitizer Software ACP_4007

Purpose of this document
It provides the installation instructions for digitizer software ACP_4007.

Document History

<table>
<thead>
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<th>Edition. Revision</th>
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<td>2.1</td>
<td>04-2007</td>
<td>• Added installation instructions for ACPL1004 language files</td>
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<td>Details see section 3.6, page 14.</td>
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Referenced Documents

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<th>Document</th>
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<tr>
<td>Preceding Bulletin</td>
<td>Release of ACPL1004 Language Files for Digitizer User Interface of CR 85-X, DD+DIS088.07E</td>
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</table>
WARNING:
Improper operation or service activities may cause damage or injuries.

INSTRUCTION:
(1) Read the "Generic Safety Directions" document (see MEDNET GSO => General Info => Agfa HealthCare => Publications => Service Manual) prior to attempting any operation, repair or maintenance task on the equipment.

(2) Strictly observe all safety directions within the "Generic Safety Directions" and on the product.
LIST OF CONTENTS

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   1.2 CR Applications ..........................................................................................................4
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3 INSTALLATION PROCEDURE .........................................................................................6
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   3.2 Creating a Backup ........................................................................................................7
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4 VERIFICATION OF SUCCESSFUL INSTALLATION .......................................................16
1 Introduction of Digitizer Software ACP_4007

1.1 Purpose of the Modification

The software version ACP_4007 incorporates a check of the internal configuration values of the photomultiplier. Therefore the update of digitizer software is required before replacement of the photomultiplier.

See chapter 3.8 of the service manual for the software release information.

1.2 CR Applications

Digitizer software ACP_4007 can be used for the following CR applications:

- General Radiography (GenRad),
- Mammography (Mammo),
- General Radiography 50 µm (Extremities), and
- Full Leg – Full Spine (FLFS)

The software cannot be used for radiotherapy applications.

1.3 Ex-Factory Installation

Software AP_4007 or higher is installed on CR 85-X digitizers with following serial numbers:

\[
\begin{align*}
\text{SN} &= 1017, 1019, 1021, 1023, 1025, 1026, 1027, 1029, 1030, 1031, 1032, 1036, 1047, 1052 \text{ and } 1060 \\
\text{SN} &> 1069
\end{align*}
\]
2 Prerequisites for Installation

REQUIRED TOOLS:
You need max. 8 empty formatted floppy disks with 1.44 MB capacity each:
- one for the backup of site specific data and
- 7 for the preparation of the installation set of floppy disks
  if you obtained the digitizer software from MedNet.

For the installation on a blank hard disk you need additionally:
- CD-ROM with test images (CM+9 5145 3055 0),
- your service PC which is equipped with a terminal program,
- a serial connection cable (RS232) with Sub D plugs (see figure 1).

![figure 1](image)

REQUIRED TIME:
- approximately 30 minutes for the software upgrade or
- approximately 60 minutes for the installation on the blank hard disk.
3 Installation Procedure

3.1 Making Installation Floppy Disks

Execute these actions if you downloaded the digitizer software from MedNet. Skip them if you obtained the software via the spare parts supply.

(1) Extract all files from the downloaded Zip file. Among the extracted files is the Zip file ACP_4007.zip.

(2) Extract all files from ACP_4007.zip into an empty folder on the service PC.

Seven sub-folders are created there:
- HDFORMAT
- PORTEX1
- PORTEX2
- ACP4007_1_3
- ACP4007_2_3
- ACP4007_3_3
- LANG_FILES

NOTE:
For each of these folders, a floppy disk with the same name is created in the following steps.

(3) Insert an empty floppy disk.

(4) Select the floppy drive entry (A:) in the Windows Explorer.

(5) Right-click the floppy drive entry and select Properties.

(6) Select tab General and enter the corresponding folder name, e.g. HDFORMAT.

(7) Click button <OK>.

(8) Copy the contents of the folder (e.g. HDFORMAT) from the service PC to the floppy disk.

(9) Remove the floppy disk from the drive and label it with the folder name, e.g. HDFORMAT.

(10) Repeat steps (3) to (9) for the other five floppy disks.

Result
Now you have the required installation set of floppy disks.
3.2 Creating a Backup
Before you do the software update, create a backup floppy disk with the machine specific data in case you have to restore it later in case of failure of the software installation.

For this, execute these actions:

(1) Open the left front door of the digitizer. You need access to the cPCI rack with floppy disk drive and \texttt{<Reset>} switch.

(2) Enter the Service menu on the digitizer keypad and select \textit{Save on floppy / Machine specific data}.

(3) Follow the guidelines on the digitizer display.

\textbf{NOTE:}
In the rare case that a backup floppy cannot be generated in this way, obtain the out-of-factory backup data using this link:
\url{http://intra.agfanet/BU/MI/MEDNET3.NSF/EN/factorybackupftp.htm}

3.3 Updating from Software ACP_4005

(1) Enter the Service menu on the digitizer keypad and select \textit{Install from floppy / Software}.

(2) Follow the instructions on the digitizer display.

(3) Close the front door and switch off/ on the digitizer. Wait until the system is ready.

\textit{Result} The digitizer software is installed. Proceed with section 3.7.
3.4 Updating from Software Versions ≤ ACP_3403

(1) Enter the Service menu on the digitizer keypad and select *Install from floppy / Software*.

(2) Insert the floppy disk labeled **PORTEX1** into the disk drive of the digitizer.

(3) Press the `<Reset>` switch on the cPCI rack.

(4) Wait until the control LED of the floppy disk drive is off.

(5) Remove the floppy disk.

(6) Insert the floppy disk labeled **PORTEX2** into the disk drive of the digitizer.

(7) Press the `<Reset>` switch on the cPCI rack.

(8) Wait until the control LED of floppy disk drive is off.

(9) Remove the floppy disk.

**NOTE:**
Do not insert any other floppy disk!

(10) Press the `<Reset>` switch on the cPCI rack.

**WAITING TIME:**
Wait approx. 2 minutes.
The files of the Portex operating system are installed.
(11) Insert the floppy disk labeled ACP4007_1_3 into the disk drive of the digitizer.

(12) Press the <Reset> switch on the cPCI rack.

(13) Wait until the control LED of floppy disk drive is off.

(14) Remove the floppy disk.

(15) Insert the floppy disk labeled ACP4007_2_3 into the disk drive of the digitizer.

(16) Press the <Reset> switch on the cPCI rack.

(17) Wait until the control LED of floppy disk drive is off.

(18) Remove the floppy disk.

(19) Insert the floppy disk labeled ACP4007_3_3 into the disk drive of the digitizer.

(20) Press the <Reset> switch on the cPCI rack.

(21) Wait until the control LED of floppy disk drive is off.

(22) Remove the floppy disk.

(23) Press the <Reset> switch on the cPCI rack.

WAITING TIME:
Wait approx. 2 minutes.
The system extracts the ACP_4007 software.

(24) Close the front door and switch off/ on the digitizer.
Result

Normally, the digitizer performs its self test and afterwards changes its state to Ready. Proceed with section 3.7.

If the digitizer does not perform the self test, the software installation was not successful. The cause is a corruption of the file system on the hard disk. Perform the installation according to section 3.5.

3.5 Installing on a corrupted or blank Hard Disk

NOTE:

This procedure must be carried out only if the hard disk of the digitizer is corrupted or has been replaced by a blank one.

In this case the hard disk must be formatted using the installation disk HDFORMAT.

1. Disconnect the digitizer from the network.
   This is necessary since a default IP-Address and hostname is configured.

2. Connect your service PC to the RS232 port at the cPCI rack.

3. Start the terminal program by opening Windows menu
   Start / Programs / Accessories / Communication / HyperTerminal.

4. Create a new connection and select your serial port (e.g., COM1).

5. Set terminal settings to 9600 baud, Xon/Xoff, no parity, 8 bit, 1 stop bit.

6. Press <ENTER>.
   The digitizer prompt shell> appears.

7. Insert the floppy disk labeled HDFORMAT into the disk drive of the cPCI rack.

8. Press the <Reset> switch on the cPCI rack.
(9) Confirm partitioning/formatting of the hard disk on your terminal with ‘y’.

(10) Wait until the system prompt is displayed on the terminal.

(11) Remove the floppy disk.

(12) Insert the floppy disk labelled **PORTEX2** into the disk drive of the digitizer.

(13) Press the <Reset> switch on the cPCI rack.

(14) Wait until the system prompt is displayed on the terminal.

(15) Remove the floppy disk.

**NOTE:**

Do not insert any other floppy disk!

(16) Press the <Reset> switch on the cPCI rack.

(17) Wait until the system prompt is displayed on the terminal.

(18) Remove the floppy disk.

(19) Insert the floppy disk labeled **ACP4007_1_3** into the disk drive of the digitizer.

(20) Press the <Reset> switch on the cPCI rack.

(21) Wait until the system prompt is displayed on the terminal.

(22) Remove the floppy disk.

(23) Insert the floppy disk labeled **ACP4007_2_3** into the disk drive of the digitizer.

(24) Press the <Reset> switch on the cPCI rack.
(25) Wait until the system prompt is displayed on the terminal.

(26) Remove the floppy disk.

(27) Insert the floppy disk labeled **ACP4007_3_3** into the disk drive of the digitizer.

(28) Press the `<Reset>` switch on the cPCI rack.

(29) Wait until the system prompt is displayed on the terminal.

(30) Remove the floppy disk.

(31) Press the `<Reset>` switch on the cPCI rack.

(32) Wait until the system prompt is displayed on the terminal. The system extracts the ACP_4007 software.

(33) Press the `<Reset>` switch on the cPCI rack.

(34) Wait until the digitizer is ready.

(35) Enter the Service menu on the digitizer keypad and select **Install from floppy / Machine specific data**.

(36) Follow the guidelines on the digitizer display. Use the backup floppy disk you created in section 3.2.

**NOTE:**
Without restoring the device-specific parameters, an operation of the digitizer is impossible.
(37) Restore the test image files from CD (CM+9 5145 3055 0) to the directory 
E:\testing on the digitizer.

(38) Generate the CPF file with the QS, the VIPS or the CCM tool. Please refer to the 
service documentation, chapter 1, for details.

(39) Enter the Service menu on the digitizer keypad and select 
Install from floppy / CPF-File.

(40) Follow the instructions displayed on the digitizer display. 
Have a floppy disk ready for the backup of device-specific parameters.

(41) Reconnect the digitizer to the network.

(42) Disconnect the service PC.

(43) Close the front door and switch digitizer power off/ on.

Result The digitizer performs its self test and afterwards changes its state to Ready. Proceed with section 3.7.
3.6 Installation of ACPL1004 Language Files

NOTE:
ACPL1004 language files are installed ex factory on following digitizers. Then a
installation of the ACPL1004 language files is not necessary.

- CR 85-X Type 5148/100: SN ≥ 1937, CW 15/2007
- CR 75.0 Type 5146/105: SN ≥ 6031, CW 15/2007

To install ACPL1004 language files and to change the language of the digitizer user interface perform following procedure:

1. Ensure that the digitizer is switched on.
2. Open Service menu on the local key pad of the digitizer.
3. Choose `<INSTALL from floppy>`
   `<language files>`
4. Open front doors of the digitizer.
5. Insert floppy disk with ACPL1004 language files at disk drive of cPCI-Rack and confirm with `<ENTER>` on the local key pad.
6. After a short while following message appears on the Service menu:
   `<Please remove the floppy and press ENTER>`
   Remove floppy disk and press ENTER to confirm.
7. Following message appears in the Service menu:
   `<Do you want to change my user interface language>`
   To change the user interface language press ENTER.
   To leave the menu without changing the language press ESC.
8. Select user interface language from list and press ENTER.
(9) Exit Service menu by pressing 🛋.

(10) When the system requests to confirm the changes press 🛋.

(11) Close the front door.

(12) Installation of ACPL1004 language files completed.

### 3.7 Concluding the Installation

**NOTE:**
Skip action (1) if the previous software version was ACP_1201 or higher.

(1) Scan or erase a cassette. The cassette doesn't need to be exposed.

(2) Open the left front door.

(3) Refresh your backup by following the guidelines of Service Menu topic *Save on floppy / Machine specific data*.

(4) Close the front door.

**NOTE:**
If the version of the previous software was less than ACP_1007, perform IP Center and Shading calibrations. Please refer to the service documentation, chapter 3.6.

**NOTE:**
If you use the digitizer for Mammography applications, enable “Mammo” manually in the Service Menu of the digitizer.
4 Verification of successful Installation

(1) Enter the Service menu on the digitizer keypad and select *Info / Device info*.

(2) Check the entry *Software*.

**Result** If the entry *Software* is equal to *ACP_4007*, the software installation was successful. Otherwise repeat the installation and closely follow the instructions in section 3.
Content of Chapter 7: Field Modifications

This chapter contains the instructions for all modifications due to technical changes since production start:

<table>
<thead>
<tr>
<th></th>
<th></th>
<th></th>
</tr>
</thead>
<tbody>
<tr>
<td>DD+DIS203.06E</td>
<td>Installation Instructions for Device Software ACP_4007</td>
<td>2.1</td>
</tr>
</tbody>
</table>
Purpose of this document

This document contains an overview of all the technical changes and their chronological introduction as a production standard. This includes hardware and software modifications.

Document History

<table>
<thead>
<tr>
<th>Edition. Revision</th>
<th>Release Date</th>
<th>Changes compared to previous version 2.0</th>
</tr>
</thead>
<tbody>
<tr>
<td>2.1</td>
<td>12-2007</td>
<td>• Introduction of High Altitude Vacuum Pump &lt;br&gt;Details see section 1, page 4. &lt;br&gt;• Introduction of Oberon 3 Board &lt;br&gt;Details see section 2, page 4.</td>
</tr>
</tbody>
</table>

Referenced Documents

<table>
<thead>
<tr>
<th>Document</th>
<th>Title</th>
</tr>
</thead>
<tbody>
<tr>
<td>n.a.</td>
<td>n.a.</td>
</tr>
</tbody>
</table>
**WARNING:**
Improper operation or service activities may cause damage or injuries.

**INSTRUCTION:**
1. Read the "Generic Safety Directions" document (see MEDNET GSO => General Info => Agfa HealthCare => Publications => Service Manual) prior to attempting any operation, repair or maintenance task on the equipment.
2. Strictly observe all safety directions within the "Generic Safety Directions" and on the product.
TABLE OF CONTENT

The following modifications of CR 85-X Type 5148/100 and CR 75.0 Type 5146/105 (as of SN ≥ 6000) are listed in chronological order, the latest modification on top of the list.

<table>
<thead>
<tr>
<th>timeline</th>
<th>Modification</th>
<th>Referenced Documents</th>
</tr>
</thead>
<tbody>
<tr>
<td><strong>2007</strong></td>
<td></td>
<td></td>
</tr>
<tr>
<td>August</td>
<td>1. Introduction of High Altitude Vacuum Pump</td>
<td>SB No. 04: DD+DIS278.07E, Enclosure: DD+DIS151.07E</td>
</tr>
<tr>
<td>June</td>
<td>2. Introduction of Oberon 3 Board</td>
<td>Enclosure: DD+DIS034.07E</td>
</tr>
<tr>
<td>April</td>
<td>3. Introduction of Language Files ACPL1004</td>
<td>SB No. 3: DD+DIS088.07E</td>
</tr>
<tr>
<td><strong>2006</strong></td>
<td></td>
<td></td>
</tr>
<tr>
<td>October</td>
<td>5. Modification of the 5-fold Stepper Motor Board</td>
<td>n.a.</td>
</tr>
<tr>
<td>July</td>
<td>6. Modification of Erasure Unit</td>
<td>n.a.</td>
</tr>
<tr>
<td>May</td>
<td>7. Introduction of Digitizer Software ACP_4007</td>
<td>Chapter 3.8: DD+DIS202.06E, Chapter 7: DD+DIS203.06E, SB No. 2: DD+DIS201.06E</td>
</tr>
<tr>
<td>April</td>
<td>8. Introduction of Digitizer Software ACP_4005</td>
<td>Chapter 3.8: DD+DIS202.06E</td>
</tr>
</tbody>
</table>

SB – Service Bulletin
1 Introduction of High Altitude Vacuum Pump

**Reason**
A modified vacuum pump has been introduced for the use of the digitizer on sites between 2000 m and 4000 m above sea level.

**Product(s) & Serial Number(s)**
The High Altitude Vacuum Pump is not part of series production and only available as upgrade kit for new installations or already installed digitizers as well as spare part for the replacement of modified vacuum pumps, which are defective.

**Part Number(s)**
- Upgrade Kit “High Altitude Vacuum Pump for CR 75.0/CR 85-X”
  ABC Code: EZKFF
- Spare part “High Altitude vacuum pump”, CM+9 5148 6230 0

**Referenced Document(s)**
- Service Bulletin No. 04, DD+DIS278.07E
- Enclosure - Replacement Instructions: High Altitude Vacuum Pump for Use on Sites between 2000 m and 4000 m above Sea Level, DD+DIS151.07E

2 Introduction of Oberon 3 Board

**Reason**
In respect to the previous Oberon Board, the Oberon 3 Board is RoHS compliant (Restriction of the use of certain Hazardous Substances in electrical and electronic equipment). No functional changes have been made.

Digitizer Software ACP_4007 or higher is required when using the Oberon 3 board. The required Digitizer Software is in scope of the spare part.

This spare part can be used in RoHS compliant and non-RoHS compliant Digitizers.

Oberon 3 Board requires Digitizer Software ACP_4007 or higher.

**Product(s) & Serial Number(s)**
- CR 85-X Type 5148/100:
  SN ≥ 2155, CW 25/2007
- CR 75.0 Type 5146/105:
  SN ≥ 6051, CW 25/2007

**Part Number(s)**
- Spare part “Oberon 3 Board”, CM+9 5146 1501 0

**Referenced Document(s)**
- Enclosure - Installation Instructions of the Oberon 3 Board, DD+DIS034.07E
3 Introduction of Language Files ACPL1004

<table>
<thead>
<tr>
<th>Reason</th>
<th>User interface language files have been released to ensure that messages in the digitizer user interface are available in several languages. Eleven languages can be used with the release of ACPL1004 language files.</th>
</tr>
</thead>
</table>
| Product(s) & Serial Number(s) | CR 85-X Type 5148/100: SN ≥ 1937 , CW 15/2007  
CR 75.0 Type 5146/105: SN ≥ 6031 , CW 15/2007 |
| Part Number(s) | • ACPL1004 language files can be obtained by Download from Mednet GSO Library: *Computed Radiography* → *CR Digitizers* → *CR 85-X* → *Freeware*  
• ACPL1004 language files are also in scope of the ACP_4007 Digitizer Software. CM+9 5146 1150 5 |
| Referenced Document(s) | Service Bulletin No. 3, Release of language files for digitizer user interface of CR 85-X, DD+DIS088.07E |

4 Modification of cPCI-Rack

<table>
<thead>
<tr>
<th>Reason</th>
<th>The power supply unit has been modified to enable the use of hard disks with higher voltage input. The modified power supply unit is RoHS compliant.</th>
</tr>
</thead>
<tbody>
<tr>
<td>Product(s) &amp; Serial Number(s)</td>
<td>SN ≥ 1666 , CW 05/2007</td>
</tr>
</tbody>
</table>
| Part Number(s) | Following spare parts have been modified:  
• Spare part “cPCI-Rack, CM+9 5146 1400 6  
• Spare part “cPCI-Rack assembled”, CM+9 5146 1405 7  
• Spare part “PCI power supply”, CM+9 5146 1430 2 |
| Referenced Document(s) | n.a. |
## 5 Modification of the 5-fold Stepper Motor Board

<table>
<thead>
<tr>
<th>Reason</th>
<th>The fixation of the 5-fold stepper motor board has been changed by introducing new clips to prevent bending of the board.</th>
</tr>
</thead>
<tbody>
<tr>
<td><strong>Product(s) &amp; Serial Number(s)</strong></td>
<td>SN ≥ 1420, CW 41/2006</td>
</tr>
<tr>
<td><strong>Part Number(s)</strong></td>
<td>The new fixation and the board are included when ordering:</td>
</tr>
<tr>
<td></td>
<td>• Spare part “slow scan 17:1 complete”: CM+9 5146 2220 7</td>
</tr>
<tr>
<td></td>
<td>• Spare part “slow scan 17:1 complete”: CM+9 5146 2220 2</td>
</tr>
<tr>
<td></td>
<td>• Spare part “chassis assy CAS 1”: CM+9 5146 5100 1</td>
</tr>
<tr>
<td></td>
<td>• Spare part “chassis assy CAS 2”: CM+9 5146 5400 1</td>
</tr>
<tr>
<td><strong>Referenced Document(s)</strong></td>
<td>n.a.</td>
</tr>
</tbody>
</table>

## 6 Modification of Erasure Unit

<table>
<thead>
<tr>
<th>Reason</th>
<th>Increase of cost effectiveness due to changed materials. Predecessors can be used in case they are still available.</th>
</tr>
</thead>
<tbody>
<tr>
<td><strong>Product(s) &amp; Serial Number(s)</strong></td>
<td>SN ≥ 1198, CW 30/2006</td>
</tr>
<tr>
<td><strong>Part Number(s)</strong></td>
<td>Spare part “erasure unit”: CM+9 5146 3500 2</td>
</tr>
<tr>
<td><strong>Referenced Document(s)</strong></td>
<td>n.a.</td>
</tr>
</tbody>
</table>
# Introduction of Digitizer Software ACP_4007

<table>
<thead>
<tr>
<th>Reason</th>
<th>Solution for:</th>
</tr>
</thead>
<tbody>
<tr>
<td></td>
<td>Internal configuration values of the photomultiplier in CR 85-X are now checked to be within the specified range.</td>
</tr>
</tbody>
</table>

<table>
<thead>
<tr>
<th>Product(s) &amp; Serial Number(s)</th>
<th>The Digitizer Software is installed ex factory on following digitizers:</th>
</tr>
</thead>
<tbody>
<tr>
<td></td>
<td>SN = 1017, 1019, 1021, 1023, 1025, 1026, 1027, 1029, 1030, 1031, 1032, 1036, 1047, 1052 and 1060</td>
</tr>
<tr>
<td></td>
<td>SN &gt; 1069</td>
</tr>
</tbody>
</table>

<table>
<thead>
<tr>
<th>Part Number(s)</th>
<th>Digitizer Software ACP_4007 - Order Number: CM+9 5146 1150 4</th>
</tr>
</thead>
<tbody>
<tr>
<td></td>
<td>or Mednet GSO Library: <a href="#">Computed Radiography ➔ CR Digitizers ➔ CR 85-X ➔ Freeware</a></td>
</tr>
</tbody>
</table>

<table>
<thead>
<tr>
<th>Referenced Document(s)</th>
<th>Chapter 3.8 of the CR 85-X Service Manual - Software Releases and Patches, <a href="#">DD+DIS202.06E</a></th>
</tr>
</thead>
<tbody>
<tr>
<td></td>
<td>Chapter 7 of the CR 85-X Service Manual - Field Modifications, <a href="#">DD+DIS203.06E</a></td>
</tr>
<tr>
<td></td>
<td>Service Bulletin No. 2, Release of Digitizer Software ACP_4007 for CR 85-X, <a href="#">DD+DIS201.06E</a></td>
</tr>
</tbody>
</table>

# Introduction of Digitizer Software ACP_4005

<table>
<thead>
<tr>
<th>Reason</th>
<th>The digitizer software ACP_4005 for CR 85-X is based on the software for the CR 75.0 digitizer. Changes and solved bugs refer to the predecessor CR 75.0 software, version ACP_3403.</th>
</tr>
</thead>
</table>

<table>
<thead>
<tr>
<th>Product(s) &amp; Serial Number(s)</th>
<th>First released software for CR 85-X.</th>
</tr>
</thead>
</table>

<table>
<thead>
<tr>
<th>Part Number(s)</th>
<th>Digitizer software ACP_4005 Order Number: CM+9 5146 1150 3</th>
</tr>
</thead>
</table>

<table>
<thead>
<tr>
<th>Referenced Document(s)</th>
<th>Chapter 3.8 of the CR 85-X Service Manual - Software Releases and Patches, <a href="#">DD+DIS202.06E</a></th>
</tr>
</thead>
</table>

*Computed Radiography ➔ CR Digitizers ➔ CR 85-X ➔ Freeware*
CR 85-X
Type 5148/100

CR 75.0
Type 5146/105
(as of SN ≥ 6000)

This documentation is separately available. Order No: DD+DIS020.07E.

CONFIDENTIALITY NOTE:
Use, dissemination, distribution or reproduction of this document by unauthorized personnel is not permitted and may be unlawful.

DOCUMENT CONTROL NOTE:
The controlled version of this document resides on MedNet. Any printed copy of this document is uncontrolled.
WARNING:
Improper operation or service activities may cause damage or injuries.

INSTRUCTION:
(1) Read the "Generic Safety Directions" document (see MEDNET GSO => General Info => Agfa HealthCare => Publications => Service Manual) prior to attempting any operation, repair or maintenance task on the equipment.
(2) Strictly observe all safety directions within the "Generic Safety Directions" and on the product.
 Purpose of this document
This document describes all routines and tests to be carried out during maintenance.

 Document History

<table>
<thead>
<tr>
<th>Edition</th>
<th>Release Date</th>
<th>Changes compared to previous version 1.0</th>
</tr>
</thead>
<tbody>
<tr>
<td>2.0</td>
<td>02-2007</td>
<td>Only layout changes as this Service Documentation is also valid for CR 75.0 Type 5146/105 (as of SN ≥ 6000).</td>
</tr>
</tbody>
</table>

 Referenced Documents

<table>
<thead>
<tr>
<th>Document</th>
<th>Title</th>
</tr>
</thead>
<tbody>
<tr>
<td>Service Bulletin</td>
<td>CR 75.0 Type 5146/105 (as of SN ≥ 6000) introduced, DD+DIS028.07E</td>
</tr>
</tbody>
</table>
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- Required Tools .............................................................................. 6
- Required Cleaning Material ............................................................ 6
- Required Spare Parts ................................................................. 7

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- Questioning of the Customer .......................................................... 8
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- Evaluation of a Flatfield ................................................................. 21

## 4 COMPLETION OF MAINTENANCE

- .................................................................................. 22
1 General Information

NOTE:
These maintenance instructions must be considered confidential.

To ensure quality and functional reliability of the system all the points listed below (minimum maintenance points) must be carried out.

• The maintenance points have been arranged in a chronologically suitable order to make the work routines as efficient as possible.
  The sequence of the maintenance points in the checklist (see appendix of this chapter) is identical with these maintenance instructions.

• If there is a detailed description for a certain maintenance point in the service documentation, this will be noted in the column "details".

• During the maintenance procedure always consider the safety instructions, see TECHNICAL DOCUMENTATION chapter 1/1.

• Please check if it is necessary to include country specific regulations as additional maintenance points!

NOTE:
Only for Systems with DRA Contract (Direct Remote Access):
In systems with DRA Contract the infocounters are checked and evaluated in regular intervals by the GSC. If there is an indication of an upcoming defect, this is noted in the DRA Report and sent to the respective NSO with instructions for measures possibly required on the machine.
Therefore we recommend to contact your NSO about this subject before maintenance, in order to perform these recommended measures in addition to the "must" maintenance points.

1.1 Maintenance Frequency

The maintenance has to be carried out:

• every 25 000 cycles or

• once every six months
1.2 Required Time

approximately 2 h incl. Quality Check

1.3 Required Tools

<table>
<thead>
<tr>
<th>Order Number</th>
<th>Description</th>
</tr>
</thead>
<tbody>
<tr>
<td>CM+9 5155 1015 2</td>
<td>Cu filter (for exposure of test images)</td>
</tr>
<tr>
<td>CM+9 5145 3055 0</td>
<td>CD with test images</td>
</tr>
<tr>
<td>commercially available</td>
<td>service PC</td>
</tr>
<tr>
<td>commercially available</td>
<td>flashlight</td>
</tr>
</tbody>
</table>

1.4 Required Cleaning Material

In addition to the standard equipment, the following cleaning substances are required:

<table>
<thead>
<tr>
<th>Order Number</th>
<th>Description</th>
</tr>
</thead>
<tbody>
<tr>
<td>CM+9 9999 0895 0</td>
<td>vacuum cleaner</td>
</tr>
<tr>
<td>CM+9 9999 0896 0</td>
<td>dirt bags for vacuum cleaner (10 x)</td>
</tr>
<tr>
<td>ABC-code: EFOJH</td>
<td>ADC cleaner</td>
</tr>
<tr>
<td>CM+9 9999 9288 0</td>
<td></td>
</tr>
<tr>
<td>ABC-code: ETRTM</td>
<td>PROSAT wipers for CR MM3.0 IP</td>
</tr>
<tr>
<td>Spare Part: 10+ 9 9999 1219 0</td>
<td></td>
</tr>
<tr>
<td>commercially available</td>
<td>dust brush</td>
</tr>
<tr>
<td>commercially available</td>
<td>lint-free cloth</td>
</tr>
<tr>
<td>commercially available</td>
<td>soft dust brush</td>
</tr>
</tbody>
</table>
1.5 Required Spare Parts

The following assortment represents a complete copy of the Maintenance Kit (CM+5146 1017 33) according to the RIML assortment categorization in the spare parts list:

<table>
<thead>
<tr>
<th>Order Number</th>
<th>Description</th>
</tr>
</thead>
<tbody>
<tr>
<td>CM+9 0450 6582 0</td>
<td>10 x erasure lamp, 100 W</td>
</tr>
<tr>
<td>CM+9 5145 9100 0</td>
<td>2 x roller (for cassette unit)</td>
</tr>
<tr>
<td>CM+9 5146 1799 2</td>
<td>2 x air filter</td>
</tr>
</tbody>
</table>
2 Maintenance Step by Step

2.1 Diagnostics

2.1.1 Questioning of the Customer

- Ask the customer for any problem that appeared since the last maintenance.

2.1.2 Infocounter Analysis

- Service PC to analyze the infocounter

1. Insert an empty floppy in the floppy drive of the cPCI rack, see figure 1.
2. In the service menu select "Save on floppy" with the key and press.
3. Select "Infocounter file" and press.
4. Remove the floppy from the floppy drive and insert it in the Service PC.
5. Unzip the file "5148_xxxx_icn.zip" (xxxx stands for serial number)
6. Start an editor (e.g. notepad or wordpad).
7. Open the file "\D\infocounter\0\infocounter.txt"
8. Evaluate the infocounter file.
### 2.1.3 How to Evaluate the Infocounter

**Evaluation of infocounters.txt**

<table>
<thead>
<tr>
<th>What to check in the infocounter</th>
<th>Comment</th>
</tr>
</thead>
<tbody>
<tr>
<td><strong>1.1 Device Info: Serial number and Installation date</strong></td>
<td>Compare device serial number to chapter 8 “Manufacturing Standard Modification” and chapter 10 “Field Service Bulletins” to determine whether the device is modified or requires a modification.</td>
</tr>
<tr>
<td><strong>1.4 Software Info</strong></td>
<td>It is recommended to have the latest software installed. Before you upgrade to a new software, make sure that your hardware is up to date.</td>
</tr>
<tr>
<td><strong>2.2 Throughput</strong></td>
<td>For throughput most important are the cycles per day. They usually count between 50 and 200.</td>
</tr>
<tr>
<td><strong>3.3 Hardware Modification History</strong></td>
<td>By comparing the status of the device with the available “Field Modifications”, chapter 7, the exact hardware status can be determined.</td>
</tr>
<tr>
<td><strong>3.4 Software Modification History</strong></td>
<td>Check the software modification history to determine, whether a recent software upgrade solved a problem, that occurred quite often in the error list.</td>
</tr>
<tr>
<td><strong>4.6 Laser Power</strong></td>
<td>Check that laser power is constant: no more than 1 mW difference in between two entries. If the value is higher, run diagnostic software and scan &amp; signals and check laser diode module.</td>
</tr>
<tr>
<td><strong>4.7 Polygon Jitter Monitoring</strong></td>
<td>If amplitude exceeded 300 milli-pixel, check accurately the image quality on the workstation. The entries are only indications and can only be interpreted as one symptom which is conducted to the optic module.</td>
</tr>
</tbody>
</table>
### Evaluation of infocounters.txt

<table>
<thead>
<tr>
<th>What to check in the infocounter</th>
<th>Comment</th>
</tr>
</thead>
<tbody>
<tr>
<td><strong>5.3 Retries</strong></td>
<td>Retries lead to less throughput of the device. If the fraction of retries exceeds 1%, compare with frequent error codes.</td>
</tr>
<tr>
<td><strong>5.7 Error History</strong></td>
<td>Check errors since last maintenance, how often they appeared as well as the CBF (cycles between failures) of these errors. This gives an overview of the current status of the machine. Compare frequently occurring errors with the error list in chapter 3.3, and take actions.</td>
</tr>
<tr>
<td><strong>5.8 Error List Relatives and 5.9 Error List Total</strong></td>
<td>Troubleshoot these errors using the technical documentation, chapter 3.3, “Troubleshooting”.</td>
</tr>
</tbody>
</table>

#### 2.1.4 Clearing Infocounter

(1) Clear the infocounters to refresh relative counters.

#### 2.1.5 Visual Check

- Flashlight

(1) Check overall condition of the machine – outside and inside – for obvious changes or damage.
### 2.2 Inside

- Vacuum cleaner
- Lint free cloth

(1) Vacuum the inside of the digitizer and wipe it.

### 2.3 Cassette Unit

- Dust brush
- Roller (CM+9 5145 9100 0)
- Toothed belt (CM+9 5145 5195 0)

**Opener Mechanism**

(1) Clean the opener mechanism with a soft dust brush.

(2) Check roller (see small circle) for visible wear and replace if necessary. In any case replace the roller once a year.

**Belt**

(3) Exchange the transport belt once a year.
2.4 Power Unit

- Soft cloth
- Air filter (CM+9 5146 1799 2)

Safety Switch

1. Open the doors of the digitizer while the machine is switched on.

2. As soon as the left door is opened only a little, all assemblies except the cPCI rack and its fan must be deenergized.

Air Filter

3. Exchange air filter at the right-side door by drawing it out of its hold (see figure 4).
2.5 cPCI Rack

- Vacuum cleaner
- Soft cloth
- Air filter (CM+9 5146 1799 2)

**General**

(1) Remove visible dust and dirt with the vacuum cleaner.

**cPCI Fan**

(2) Open the doors when the machine is switched on.

   The power supply of the cPCI rack and its fan must still be on.

**Air Filter**

(3) Clean the grid of the fan with a soft cloth.

(4) Exchange the air filter 2 by moving the clamp 1 up for taking out and down after putting in.
2.6 Scan Unit

- Soft cloth
- ADC Cleaner (if not available, use water)
- Discharge brush (CM+9 5145 2442 1)

(1) Slide out the scan unit.

(2) Clean the scan rollers on prescan and postscan side with ADC Cleaner.

**CAUTION:**

**Risk of damaging the scan unit.**

Do not remove the scan rollers. Clean the scan rollers in place by moving the slow scan motor manually.

2.7 Transport Units

- ADC Cleaner (if not available, use water)
- Suction cups (CM+9 5145 6550 2)

(1) Check position of the suction cups 1.

(2) Clean the suction cups with ADC cleaner.

(3) In case of vacuum problems, check the suction cups by bending up the edges (check for tears) and replace if necessary.
2.8 Erasure Unit

- Soft cloth
- Dust brush
- ADC Cleaner (if not available, use water)
- 1 set of 10 pieces 100 W halogen erasure lamps: Philips CAPSULEline Pro (CM+9 0450 6582 0)

Fan
(1) Open the doors of the digitizer.
(2) Clean the grid of the fan with a soft cloth and a dust brush.

Lamps
(3) Remove the complete erasure unit.
(4) Remove the pane 4 (see figure 9).
(5) Remove all lamps 1.
(6) Dust the following parts:
   - reflector
   - input and output opening of the air stream (protection grid) 2 (see figure 9)
   - KG2 filter 3 (see figure 9)
   - outer front panel
**CAUTION:**
Risk of damage when using wrong cleaning method.
Do not use any fluid for cleaning of the inner side of the large glass plate since it is coated with a gelatin layer.

(7) Check the KG2 filter 3 for damage and replace if necessary.

(8) Insert new lamps every maintenance.

![figure 9](5146_reg02_021.cdr)

**NOTE:**
Do not touch the lamps with bare fingers!
Use a dry, soft cloth to insert the lamp.

(9) Check the pins 5 for damage and correct position.

(10) Re-insert the Erasure Unit.
2.9 Cassettes

- Aluminum label (CM+9 8300 1131 0)

Visual Check

(1) Check the most frequently used cassettes and image plates for damage. If damage is noticed, check further cassettes.

(2) Check the following test points of the cassette:
- Outside condition
- Hinges
- Locking
- Opening leaf springs
- Aluminum label

(3) Attach missing aluminum label.

NOTE:
The digitizer needs the aluminum label to recognize ADC cassettes.

2.10 Image Plates

CAUTION:
Wrong screen cleaner may damage the Image plate.
Do not use the AGFA CR phosphor plate cleaner to clean the CR MM3.0 Mammo image plates. Use PROSAT wipers instead.

Visual Check

(1) Check if there are scratches on the surface.

(2) Check if edges are loose as an indication for mechanical problems at IP transport.
3 Checking the Image Quality

**WARNING:**
Poor image quality caused by incorrect cassette initialization.
Initialize the cassette/plate as described in the corresponding user manual.

3.1 Test Cycles
(1) Carry out four test cycles with each format of the cassettes.

3.2 Exposure of a Flatfield
Expose an image plate of every format and evaluate all the images on the Processing Station and a printer. Following, check the flatfield for homogenous field or stripes criteria. The hard disk of the digitizer provides two flatfield samples for quality comparison.

**NOTE:**
Repeat this procedure for all formats on site!

- Flatfield
  (1) Print the flatfield sample provided by the digitizer:
  - Start the service program.
  - Select from the service menu
    `<Checks>`
    `<Send flatfield>`
    `<Calibration pattern>`
    `<Banding pattern>`
  (2) Print the flatfields "Calibration" and "Banding" via the Processing Station (window setting of 0.6, without changing the level setting).
(3) Expose a new image plate:

- Place the cassette in length direction to the X-ray tube, see figure 11.
- Set the following exposure parameters:
  - 12 mAs, 75 kVp, 1.3 m distance
  - Doses 10 µGy
    (result of setting: 12 mAs, 75 kVp, 1.3 m distance)
  - 1.5 mm Cu filter with small focus
- Turn cassette by 180°.
- Expose plate a second time by using the same parameters.

NOTE:
Notice, that all exposure parameters are approximate values.

(4) Identify the cassette on the ID Station:

- In the <Patient name> field, type a name and a cassette format, e.g. Flatfield 18 x 24.
- In the <First name> field, type the serial number of the digitizer, e.g. SN1356.
- In the <Birth date> field, type the current date, e.g. 21012005 (use date format ddmmyyyy for day/month/year).
- In the <Radiologist> list, click <SERVICE>.
- In the <Examination> list, click <system diagnosis>.
- In the <Sub-examination> list, click <Flatfield>.
- Confirm the Exposure class <200>.

NOTE:
Make sure that the outlined areas are filled in as shown in the example.
(5) Insert the cassette into the digitizer and print the image on a printer with a window setting of 0.6 without changing the level setting.
3.3 Evaluation of a Flatfield

(1) Inspect the developed image for homogeneity:
   Compare the prints of the flatfield sample with your exposed flatfield at a light box.
   - If there are no lines visible or the effects are less than on the example, the image quality is all right.
   - If there are unacceptable effects, compare with the following sketches.

**Calibration Lines**
Blurred dark lines in slow scan direction on the flatfield (see figure 13).
- Expose another flatfield and compare it again with the sample.

If there are still unacceptable effects, you have to redo shading calibration as described in chapter 3.6.
Expose another flatfield and compare it again with the sample.

**NOTE:**
If there are still unacceptable effects, please contact the Support Center.

**Figure 13**

**Banding**
Fine sharp white or gray lines in fast scan direction on the flatfield (see figure 14).
- Check polygon monitoring entries and diagnostic images.

**NOTE:**
If there are still unacceptable effects please contact the Support Center.

**Figure 14**
**Dust**

Fine sharp lines in slow scan direction on the flatfield (see figure 15).

- Check if scanner is dusty. In case of, use the scan brush to remove it. Expose another flatfield and compare it again with the sample.

![figure 15](image)

NOTE:

If there are still unacceptable effects please contact the **Support Center**.

### 4 Completion of Maintenance

1. Confirm the maintenance by signing the checklist.
2. Make a backup of the system on floppy.
3. Inform the customer about what was done during the maintenance and which repairs need to be done in next future.
Page intentionally left blank for printout.
Purpose of this document
This document contains the Maintenance Checklist.

Document History

<table>
<thead>
<tr>
<th>Edition Revision</th>
<th>Release Date</th>
<th>Changes compared to previous version 1.0</th>
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<td>2.0</td>
<td>02-2007</td>
<td>• Only layout changes as this Service Documentation is also valid for CR 75.0 Type 5146/105 (as of SN ≥ 6000).</td>
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Referenced Documents

<table>
<thead>
<tr>
<th>Document</th>
<th>Title</th>
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<tbody>
<tr>
<td>Service Bulletin</td>
<td>CR 75.0 Type 5146/105 (as of SN ≥ 6000) introduced, DD+DIS028.07E</td>
</tr>
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</table>
WARNING:
Improper operation or service activities may cause damage or injuries.

INSTRUCTION:
(1) Read the "Generic Safety Directions" document
(see MEDNET GSO => General Info => Agfa HealthCare => Publications => Service Manual) prior to attempting any operation, repair or maintenance task on the equipment.

(2) Strictly observe all safety directions within the "Generic Safety Directions" and on the product.
1 Maintenance Checklist

Work Instruction for order no.  SN  Film cycles

The maintenance has to be carried out:
Once every six months or every 25 000 cycles

NOTE:
Maintenance must be carried out according to the maintenance instructions DIS020.07E

<table>
<thead>
<tr>
<th>Maintenance Step by Step</th>
<th>Done</th>
</tr>
</thead>
<tbody>
<tr>
<td>Diagnostics</td>
<td></td>
</tr>
<tr>
<td>• Ask customer about problems</td>
<td>☐</td>
</tr>
<tr>
<td>• Read out the infocounters, analyse them and clear them afterwards</td>
<td>☐</td>
</tr>
<tr>
<td>• Check the overall condition visually</td>
<td>☐</td>
</tr>
<tr>
<td>Inside</td>
<td></td>
</tr>
<tr>
<td>• Vacuum the inside and wipe it</td>
<td>☐</td>
</tr>
<tr>
<td>Cassette Unit</td>
<td></td>
</tr>
<tr>
<td>• Clean opener mechanism</td>
<td>☐</td>
</tr>
<tr>
<td>• Check roller for visible wear and exchange it if necessary</td>
<td>☐</td>
</tr>
<tr>
<td>• Exchange belt once a year</td>
<td>☐</td>
</tr>
<tr>
<td>Power Unit</td>
<td></td>
</tr>
<tr>
<td>• Check electrical function of safety switch</td>
<td>☐</td>
</tr>
<tr>
<td>• Exchange air filter</td>
<td>☐</td>
</tr>
<tr>
<td>cPCI Rack</td>
<td></td>
</tr>
<tr>
<td>• Remove dust and dirt</td>
<td>☐</td>
</tr>
<tr>
<td>• Check electrical function of the cPCI-Rack fan</td>
<td>☐</td>
</tr>
<tr>
<td>• Clean grid of the fan and exchange air filter</td>
<td>☐</td>
</tr>
</tbody>
</table>
## Maintenance Step by Step

<table>
<thead>
<tr>
<th>Maintenance Step</th>
<th>Done</th>
</tr>
</thead>
<tbody>
<tr>
<td><strong>Scan Unit</strong></td>
<td></td>
</tr>
<tr>
<td>- Clean scan rollers with ADC cleaner (do not remove!)</td>
<td>☐</td>
</tr>
<tr>
<td><strong>Transport Units</strong></td>
<td></td>
</tr>
<tr>
<td>- Check position of suction cups and clean them with ADC cleaner</td>
<td>☐</td>
</tr>
<tr>
<td><strong>Erasure Unit</strong></td>
<td></td>
</tr>
<tr>
<td>- Clean grid of the fan</td>
<td>☐</td>
</tr>
<tr>
<td>- Remove dust from reflector, input and output opening of air stream, KG2 filter, outer front panel</td>
<td>☐</td>
</tr>
<tr>
<td>- Check the KG2 filter</td>
<td>☐</td>
</tr>
<tr>
<td>- Exchange lamps every maintenance</td>
<td>☐</td>
</tr>
<tr>
<td><strong>Cassettes</strong></td>
<td></td>
</tr>
<tr>
<td>- Check the following items of the cassette: outside condition, hinges, locking, opening leaf springs, aluminum label</td>
<td>☐</td>
</tr>
<tr>
<td>- Attach missing aluminum labels</td>
<td>☐</td>
</tr>
<tr>
<td><strong>Image Plates</strong></td>
<td></td>
</tr>
<tr>
<td>- Check if there are scratches on the surface</td>
<td>☐</td>
</tr>
<tr>
<td>- Check if edges are loose</td>
<td>☐</td>
</tr>
</tbody>
</table>

## Checking Image Quality

<table>
<thead>
<tr>
<th>Maintenance Step</th>
<th>Done</th>
</tr>
</thead>
<tbody>
<tr>
<td><strong>General</strong></td>
<td></td>
</tr>
<tr>
<td>- Check the last 20 to 40 images on the CR QS station Carry out test cycles, four with each format</td>
<td>☐</td>
</tr>
<tr>
<td>- Expose a flatfield</td>
<td>☐</td>
</tr>
<tr>
<td>- Print flatfield sample provided by the digitizer</td>
<td>☐</td>
</tr>
<tr>
<td>- Evaluate the flatfield and carry out respective actions</td>
<td>☐</td>
</tr>
</tbody>
</table>

## Completion of Maintenance

<table>
<thead>
<tr>
<th>Maintenance Step</th>
<th>Done</th>
</tr>
</thead>
<tbody>
<tr>
<td><strong>General</strong></td>
<td></td>
</tr>
<tr>
<td>- Confirm the maintenance</td>
<td>☐</td>
</tr>
<tr>
<td>- Make a backup of the system on floppy</td>
<td>☐</td>
</tr>
<tr>
<td>- Inform the customer about maintenance and which repairs are necessary</td>
<td>☐</td>
</tr>
</tbody>
</table>
Please note

Service Bulletins are not part of the Service Manual for Download.

Please download the Service Bulletins from the GSO Library:
MEDNET GSO → Computed Radiography → CR Digitizers → CR 85-X → Service Bulletin
CR 85-X
Type 5148/100

CR 75.0
Type 5146/105
(as of SN ≥ 6000)

This document is separately available. Order Number: DD+DIS021.07E
**Manufacturer**

Agfa HealthCare N.V.

**Publisher**

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---

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---

**NOTE:**

To verify the latest version of single documents and of Service Manuals refer to the Document Type ‘Order List’ in the GSO library.

---

**DOCUMENT CONTROL NOTE:**

The controlled version of this document resides on MedNet. Any printed copy of this document is uncontrolled.
Purpose of this Document

This document contains all planning data including the required measures to be carried out on site prior to the machine delivery.

This chapter is divided into:

- Construction planning data
- Technical connection and performance data
- Safety instructions, listing of certificates

Document History

<table>
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<tr>
<th>Edition. Revision</th>
<th>Release Date</th>
<th>Changes compared to previous version 2.1</th>
</tr>
</thead>
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<td>2.2</td>
<td>04-2009</td>
<td>Updated section 7.3: Network Connections</td>
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<tr>
<td></td>
<td></td>
<td>Added section 7.4: Removable Storage</td>
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Referenced Documents

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<tr>
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3 SCOPE OF DELIVERY ................................................................................................. 7
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# Installation Planning-Checklist

<table>
<thead>
<tr>
<th>#</th>
<th>Step</th>
<th>Goal</th>
<th>Section</th>
<th>Okay</th>
</tr>
</thead>
<tbody>
<tr>
<td>1.</td>
<td>Ask the Agfa sales representative for a contact person in the hospital.</td>
<td>A installation date can be scheduled with the customer.</td>
<td>-</td>
<td></td>
</tr>
<tr>
<td>2.</td>
<td>Make yourself familiar with the System Overview.</td>
<td>To see in which environment the digitizer will be installed.</td>
<td>2</td>
<td></td>
</tr>
<tr>
<td>3.</td>
<td>Make yourself familiar with the scope of delivery.</td>
<td>Basic information, to see whether additional, site specific material for installation might be required.</td>
<td>3</td>
<td></td>
</tr>
<tr>
<td>4.</td>
<td>Make yourself familiar with the available accessories.</td>
<td>To be able to order required accessories before the installation.</td>
<td>4</td>
<td></td>
</tr>
<tr>
<td>5.</td>
<td>Have a look at the machine dimensions.</td>
<td>To be able to check, whether the digitizer fits in the desired installation place.</td>
<td>5.1</td>
<td></td>
</tr>
<tr>
<td>6.</td>
<td>Check the required free space around the digitizer.</td>
<td>To see whether enough free space for repair and maintenance is available.</td>
<td>5.2</td>
<td></td>
</tr>
<tr>
<td>7.</td>
<td>Check the required transport path of the digitizer.</td>
<td>Transport to the installation site, unpacking and taking the machine off the pallet must be done by the carrier.</td>
<td>5.3</td>
<td></td>
</tr>
<tr>
<td>8.</td>
<td>Make yourself familiar with the digitizer specifications.</td>
<td>To have all digitizer parameters available which might be required for people who are in involved in installation and operation of the digitizer.</td>
<td>6</td>
<td></td>
</tr>
<tr>
<td>9.</td>
<td>Compare the required ambient and climatic conditions with the condition at the installation place.</td>
<td>To prevent installation of the digitizer in an inappropriate environment, leading to functional faults.</td>
<td>6.4</td>
<td></td>
</tr>
<tr>
<td>10.</td>
<td>Make an appointment with the house electrician or the authorized electrician and check the required electrical connection.</td>
<td>To be able to initiate all required prerequisites in advance to allow proper electrical connections.</td>
<td>7</td>
<td></td>
</tr>
<tr>
<td>11.</td>
<td>Organize the required network parameters to hook up the digitizer in the existing network.</td>
<td>To have all parameters in advance, to prevent a delay during installation.</td>
<td>8.1</td>
<td></td>
</tr>
<tr>
<td>12.</td>
<td>Make an appointment with the clinical application specialist.</td>
<td>The cpf-file has to be created with the clinical application specialist.</td>
<td>8.2</td>
<td></td>
</tr>
<tr>
<td>13.</td>
<td>Have a look at the digitizer safety standards and regulations.</td>
<td>To have the safety standards and regulations for which the printer is tested available in case they are requested by the hospital administration.</td>
<td>9</td>
<td></td>
</tr>
<tr>
<td>14.</td>
<td>Confirm the installation readiness.</td>
<td>To be sure that all required pre-installation conditions are fulfilled.</td>
<td>Last Page</td>
<td></td>
</tr>
</tbody>
</table>
NOTE:
This document describes the Installation Planning of the Digitizers
- CR 85-X Type 5148/100
- CR 75.0 Type 5146/105 (as of SN ≥ 6000).

For the Installation Planning of other CR components please refer to:
MedNet GSO Library: Computed Radiography → CR Workstation Software

2 System Overview

The above example shows the digitizer connected to a Windows® XP based NX Processing Station. Instead of the NX Processing Station a CR Quality System (CR QS) can also be used.

It may as well be connected to a Unix based ADC System (VIPS Processing Station).
3 Scope of Delivery

A packing list is part of the delivery:

![Packing List CR 85-X](image_url)

Figure 2: Example of packing list CR 85-X

4 Accessories and country-specific Specifications

Following accessories are available for CR 85-X/CR 75.0:

- CR user station
- PACS station (archive) with diagnostic viewing station
- Lead glass shield to protect from scatter radiation in case the CR user station is installed in the X-ray room
- High Altitude Vacuum Pump for use on sites between 2000 m and 4000 m above Sea Level (ABC Code: EZKFF)
5 Machine Dimensions and Transport Path

5.1 Machine Dimensions of Digitizer

Figure 3
5.2 **Required free space for Repair and Maintenance**

Free space as shown in the drawing must be reserved for repair and maintenance. Less space may result in longer repair times!

- **A** Required free space for the ventilation, Power and Ethernet connection
- **B** Operation side, required free space for replacement and servicing of complete modules.

![Figure 4](image-url)

Figure 4
5.3 Transport Path

Make sure that it is possible to transport the digitizer through all hallways and doors up to the installation site:

<table>
<thead>
<tr>
<th>Dimensions</th>
</tr>
</thead>
<tbody>
<tr>
<td><strong>Package on a pallet</strong></td>
</tr>
<tr>
<td>160 cm x 100 cm x 128 cm (63” x 40” x 51”) (H x W x D)</td>
</tr>
<tr>
<td><strong>Digitizer dimensions</strong></td>
</tr>
<tr>
<td>142 cm x 84 cm x 115 cm (56” x 34” x 46”) (H x W x D)</td>
</tr>
<tr>
<td><strong>Minimum space for unpacking the machine and lifting it off the pallet</strong></td>
</tr>
<tr>
<td>200 x 500 cm (78.8” x 197”)</td>
</tr>
</tbody>
</table>

![Figure 5](5148_Chap01_019.cdr)

<table>
<thead>
<tr>
<th>Weight</th>
</tr>
</thead>
<tbody>
<tr>
<td><strong>Digitizer with Package</strong></td>
</tr>
<tr>
<td>approx. 465 kg (1070 lbs)</td>
</tr>
<tr>
<td><strong>Digitizer without Package</strong></td>
</tr>
<tr>
<td>approx. 405 kg (893 lbs)</td>
</tr>
</tbody>
</table>

**NOTE:**

Once the machine is unpacked, it can be moved to the installation site on four mounted rollers.

Make sure that the floor covering is solid enough to stand the weight of the digitizer.
6 Specifications

6.1 Type Definition

<table>
<thead>
<tr>
<th>Digitizer</th>
<th>Type</th>
</tr>
</thead>
<tbody>
<tr>
<td>CR 85-X</td>
<td>5148/100</td>
</tr>
<tr>
<td>CR 75.0</td>
<td>5146/105 (as of SN ≥ 6000)</td>
</tr>
</tbody>
</table>

6.2 Technical Data

<table>
<thead>
<tr>
<th>Scan Technology</th>
</tr>
</thead>
<tbody>
<tr>
<td>Red laser diode</td>
</tr>
<tr>
<td>6 facetted polygon scanner</td>
</tr>
<tr>
<td>Resolution</td>
</tr>
<tr>
<td>Up to 10 lp/mm</td>
</tr>
<tr>
<td>Greyscale levels</td>
</tr>
<tr>
<td>4096 (12 bit)</td>
</tr>
<tr>
<td>Throughput</td>
</tr>
<tr>
<td>≤ 115 IPs / hour depending on size and application</td>
</tr>
</tbody>
</table>

<table>
<thead>
<tr>
<th>Approx. cassette cycles</th>
<th>Per…</th>
</tr>
</thead>
<tbody>
<tr>
<td>200</td>
<td>Day</td>
</tr>
<tr>
<td>4,000</td>
<td>Month</td>
</tr>
<tr>
<td>50,000</td>
<td>Year</td>
</tr>
</tbody>
</table>

6.3 Electrical Data

<table>
<thead>
<tr>
<th>Rated Voltage [~V]</th>
<th>230 V – 240 V (16 A)</th>
</tr>
</thead>
<tbody>
<tr>
<td></td>
<td>200 V – 208 V (15 A)</td>
</tr>
<tr>
<td>Frequency [Hz]</td>
<td>50 / 60</td>
</tr>
<tr>
<td>Power Consumption [W]</td>
<td>Standby approx. 300 W</td>
</tr>
<tr>
<td></td>
<td>Maximum approx. 1700 W (= 8.5 A)</td>
</tr>
<tr>
<td>Leakage Current</td>
<td>&lt; 0.5 mA</td>
</tr>
<tr>
<td></td>
<td>&lt; 0.3 mA</td>
</tr>
<tr>
<td>(center tab, USA)</td>
<td></td>
</tr>
</tbody>
</table>
Typical Current Consumption for the Digitizer:

<table>
<thead>
<tr>
<th>Type 5148/100 Type 5146/105</th>
<th>Standby</th>
<th>IP-Handling</th>
<th>Handling and Erasing</th>
</tr>
</thead>
<tbody>
<tr>
<td>Current at 200 V</td>
<td>&lt; 1,5 A</td>
<td>&lt; 2,5 A</td>
<td>&lt; 9 A</td>
</tr>
<tr>
<td>Current at 208 V</td>
<td>&lt; 1,5 A</td>
<td>&lt; 2,5 A</td>
<td>&lt; 8,5 A</td>
</tr>
<tr>
<td>Current at 230 V</td>
<td>&lt; 1,5 A</td>
<td>&lt; 2 A</td>
<td>&lt; 8,5 A</td>
</tr>
</tbody>
</table>

* The most current is consumed during the erasure of IPs. The erasure time depends on X-ray dose and IP size.

6.4 Climatic and Ambient Conditions

Transport Conditions (Temperature and Humidity)

<table>
<thead>
<tr>
<th>Temperature</th>
<th>0 °C (32 °F) for 72 hrs. +55 °C (131 °F) for 96 hrs.</th>
</tr>
</thead>
<tbody>
<tr>
<td>Relative Humidity</td>
<td>15 % to 80 %</td>
</tr>
</tbody>
</table>

Storage and Operating Conditions (Temperature and Humidity)

<table>
<thead>
<tr>
<th>Ambient Temperature</th>
<th>20 °C min. (68 °F min.) 30 °C max. (86 °F max.)</th>
</tr>
</thead>
<tbody>
<tr>
<td>Rate of Change of Temperature</td>
<td>0.5 °C per min.</td>
</tr>
<tr>
<td>Relative Humidity (at 25°C / 77°F ambient temp.)</td>
<td>15 % min. 80 % max. 40-50 % ideal</td>
</tr>
</tbody>
</table>

Light Tightness

<table>
<thead>
<tr>
<th>Tightness</th>
<th>SAL&lt;sub&gt;MIN&lt;/sub&gt; still met at 2500 Lux ambient light</th>
</tr>
</thead>
</table>

NOTE:
The digitizer must not be operated in direct sunlight exposure.
### Magnetic Fields

| Max. permissible Magnetic Field in the Room | According to EN 61000-4-8: Level 3 (10 A/m) |

### Floor Conditions

<table>
<thead>
<tr>
<th>Base</th>
<th>Digitizer stands on a base plate, 2 mm (0,08”) thickness</th>
</tr>
</thead>
<tbody>
<tr>
<td>Horizontal Alignment</td>
<td>Digitizer works without leveling, horizontal alignment is not required. Nevertheless, the digitizer should be run preferably in a horizontal position. Take care that the digitizer cannot tilt at the installation site.</td>
</tr>
</tbody>
</table>

### 6.5 Influence on the Environment

#### Emissions

<table>
<thead>
<tr>
<th>Noise Level</th>
<th>During scanning: max. 65 dB (A), stand-by mode / idle: max. 46 dB (A)</th>
</tr>
</thead>
<tbody>
<tr>
<td>Radio interference</td>
<td>Complies with CISPR11 class B</td>
</tr>
<tr>
<td>Heat Dissipation</td>
<td>At max. throughput with 35x43 cm IP: 1.572 kWh (5365 BTU) per hour, at stand-by mode: 0.3 kWh (1024 BTU) per hour</td>
</tr>
</tbody>
</table>
7 Electrical Connections

7.1 External Fuse Protection

<table>
<thead>
<tr>
<th>Fuse</th>
<th>Rated Voltage (single phase)</th>
</tr>
</thead>
<tbody>
<tr>
<td>Max. line fuse 16 A</td>
<td>240 V +/- 10 %</td>
</tr>
<tr>
<td>Max. line fuse 16 A</td>
<td>230 V +/- 10 %</td>
</tr>
<tr>
<td>Max. line fuse 15 A</td>
<td>208 V +/- 10 % (e.g. USA)</td>
</tr>
<tr>
<td>Max. line fuse 15 A</td>
<td>200 V +/- 10 % (e.g. Japan)</td>
</tr>
</tbody>
</table>

7.2 Power Connection and Cables

Ensure the availability of power socket close to the installation location (approx. 1m distance maximum).
The UTP network cable is 5 m (197") long (2 x RJ45 connection).
Single phase connection, operable on 50 Hz and 60 Hz.
The digitizer has an automatic voltage selector. Voltage is adapted automatically as soon as the machine is switched on. The selected voltage is displayed on a LED at the inner side of the right door.

Two cables are included as standard delivery:
- USA/Japan: Nema 6-15 P
- Europe: CEE(7)VII 250 V/16 A
7.3 **Network Connection**

<table>
<thead>
<tr>
<th>Network Interfaces</th>
<th>Description</th>
</tr>
</thead>
</table>
| Ethernet port with RJ45 socket. 10/100 MBit/s, half duplex: | - CR 75.0 Type 5146 / 105 up to SN < 6500  
- CR 85-X Type 5148 / 100 up to SN < 4000 |
| Ethernet port with RJ45 socket. 10/100 MBit/s, full duplex: | - CR 75.0 Type 5146 / 105 as of SN ≥ 6500  
- CR 85-X Type 5148 / 100 as of SN ≥ 4000 |
| Serial Port RS232 for Service interface. | |

<table>
<thead>
<tr>
<th>Network protocols (TCP/IP services)</th>
<th>Description</th>
</tr>
</thead>
<tbody>
<tr>
<td>FTP</td>
<td></td>
</tr>
<tr>
<td>Telnet</td>
<td></td>
</tr>
<tr>
<td>HTTP</td>
<td></td>
</tr>
</tbody>
</table>

7.4 **Removable Storages**

- Floppy disk drive in the following devices:  
  - CR 75.0 Type 5146 / 105 up to SN < 6500  
  - CR 85-X Type 5148 / 100 up to SN < 4000
- USB Port in the following devices:  
  - CR 75.0 Type 5146 / 105 as of SN ≥ 6500  
  - CR 85-X Type 5148 / 100 as of SN ≥ 4000

**NOTE:**  
The USB port of the digitizer does not accept all types of USB stick.  
USB Memory Stick must support USB version 1.1.
8 System Integration

8.1 Required Network Parameters

ACTION:
Collect the network parameters from a hospital IT representative and note it in the table below.
Therefore ask the hospital IT-Manager to define and provide settings for the network environment for all Agfa components that have to be configured:

### Digitizer Parameters:

<table>
<thead>
<tr>
<th>Digitizer</th>
<th>Example</th>
<th>1st Digitizer</th>
<th>2nd Digitizer</th>
<th>Remarks</th>
</tr>
</thead>
<tbody>
<tr>
<td>Hostname</td>
<td>adcc1</td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>ip_addr.</td>
<td>192.9.200.199</td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Subnet_mask</td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>default router</td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>AE_title</td>
<td>ADCC1</td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Station Name *</td>
<td>ADCC1</td>
<td></td>
<td></td>
<td></td>
</tr>
</tbody>
</table>

* Station name appears in the USER interface.

### NX Processing Station Parameters:

<table>
<thead>
<tr>
<th>NX Processing Station</th>
<th>Example</th>
<th>1st Processing Station</th>
<th>2nd Processing Station</th>
<th>Remarks</th>
</tr>
</thead>
<tbody>
<tr>
<td>hostname</td>
<td>nx_001</td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>ip_addr.</td>
<td>192.9.200.208</td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Subnet_mask</td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>default router</td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
</tbody>
</table>
### CR QS Server Station Parameters:

<table>
<thead>
<tr>
<th>CR QS Server Station</th>
<th>Example</th>
<th>1st Server Station</th>
<th>2nd Server Station</th>
<th>Remarks</th>
</tr>
</thead>
<tbody>
<tr>
<td>Hostname</td>
<td>adc_qs</td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>ip_addr.</td>
<td>192.9.200.202</td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>subnet_mask</td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>default router</td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>AE_title</td>
<td>ADC_QS</td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Station Name *</td>
<td>ADC_QS</td>
<td></td>
<td></td>
<td></td>
</tr>
</tbody>
</table>

* ADC (VIPS) Processing Station.  * Station name appears in the USER interface.

### CR QS Client Station Parameters:

<table>
<thead>
<tr>
<th>CR QS Client Station</th>
<th>Example</th>
<th>1st Client Station</th>
<th>2nd Client Station</th>
<th>Remarks</th>
</tr>
</thead>
<tbody>
<tr>
<td>hostname</td>
<td>qc206</td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>ip_addr.</td>
<td>192.9.200.206</td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Subnet_mask</td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>default router</td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
</tbody>
</table>

* or ADC Preview Station.

### ID-Station Parameters:

<table>
<thead>
<tr>
<th>ID-Station</th>
<th>Example</th>
<th>1st ID-Station</th>
<th>2nd ID-Station</th>
<th>Remarks</th>
</tr>
</thead>
<tbody>
<tr>
<td>hostname</td>
<td>id207</td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>ip_addr.</td>
<td>192.9.200.207</td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Subnet_mask</td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>default router</td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>AE_title</td>
<td>ID207</td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Station Name *</td>
<td>ID207</td>
<td></td>
<td></td>
<td></td>
</tr>
</tbody>
</table>

* Station name appears in the USER interface.
### Hard Copy Printer Parameters:

<table>
<thead>
<tr>
<th>Hard Copy Printer</th>
<th>Example</th>
<th>1st HCP</th>
<th>2nd HCP</th>
<th>Remarks</th>
</tr>
</thead>
<tbody>
<tr>
<td>hostname</td>
<td>mg1</td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>ip_addr.</td>
<td>192.9.200.201</td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Subnet_mask</td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>default router</td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>AE_title</td>
<td>ADC_LR1</td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Station Name *</td>
<td>ADC_LR1</td>
<td></td>
<td></td>
<td></td>
</tr>
</tbody>
</table>

* Station name appears in the USER interface.

### PACS Archive Station Parameters:

<table>
<thead>
<tr>
<th>PACS Archive Station</th>
<th>Example</th>
<th>1st Archive Station</th>
<th>2nd Archive Station.</th>
<th>Remarks</th>
</tr>
</thead>
<tbody>
<tr>
<td>hostname</td>
<td>simas1</td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>ip_addr.</td>
<td>192.9.200.101</td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Subnet_mask</td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>default router</td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>AE_title</td>
<td>SIMAS1</td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Station Name *</td>
<td>IMPAX</td>
<td></td>
<td></td>
<td></td>
</tr>
</tbody>
</table>

* Station name appears in the USER interface.
8.2 CPF-file

NOTE:
When integrating the digitizer into an existing network, it is necessary to create a CPF-file beforehand.

With a ADC Network (1 Digitizer, 1 Image Processing Station, 1 Preview/ID Station), the shipment configuration can be used.

Instructions for creating a CPF-file:

(1) Contact the hospital administrator for the IT data.
(2) Create and adapt the configuration file (adc.cpf) together with the application specialist via the Description of the CCM Tool 1.1.07. (see Chapter 11, DD+DIS181.03E), before starting the installation.

NOTE:
For detailed information see ADC System Components (DD+DIS198.00E, Chapter 6.2)

DOCUMENTATION:
- ADC Application Manual Chapter 11 – Description of the CCM Tool 1.1.07, DD+DIS181.03E.
- ADC System Components Chapter 6.2, DD+DIS198.00E

SOFTWARE:
Following Service Programs are required and have to be installed on the Service PC or the PC of the ID / Preview Station.

- CCM Tool and documentation (necessary to create the configuration file adc.cpf):
  MedNet GSO Library:
  Computed Radiography → CR Accessories → ADC System Components → Freeware → ADC System Components - Software - CCM Tool 1.1.07 plus documentation
  The CCM - Tool is needed to create and modify the configuration file (adc.cpf) for the CR 85-X and the other ADC System Components.
- Show Error Program (provided by Training Center):
  The Show Error Program with the "ERROR.MSG file" translates the CR 85-X error codes into clear text.
9 Safety Regulations

9.1 Installation Regulations

Electrical installations in the installation room must be in compliance with:
- IEC 60364: international guidelines
- HD 60364: European standard to transfer in national standards (e.g. for Germany: VDE 0100)
- NEC for USA / Canada.

Prior to any electrical installation, the local regulations for electrical installations have to be consulted as well.

A ground fault circuit interrupter (GFCI) is recommended, but not compulsory.

Mains connection via plug and socket.

9.2 Certificates

The CR 85-X Type 5148/100 and CR 75.0 Type 5146/105 (as of SN ≥ 6000):
- are in compliance with EG regulation 93/42/EEC (Medical device directive).
- comply with:
  
  **The general safety regulations:**
  - IEC 60601-1-2: 2001
  - UL 2601-1 Second Edition
  - CAN/CSA 22.No.601.1-M90

  **The laser safety regulations:**
  - DHHS/FDA 21 CFR, Parts 1040.10 and 1040.11
  - ANSI Z 136-1980

![TUV, UL, and CE marks]
9.3 Radio Interference Suppression

It is hereby certified that the CR 85-X Type 5148/100 and CR 75.0 Type 5146/105 (as of SN ≥ 6000) have interference suppression according to EN 55011: 1998 Class B as well as FCC Rules CR47 Part 15 Class B (North-America).

CAUTION: For USA only:
This equipment generates, uses and can radiate radio frequency energy and, if not installed and used in accordance with the service manual, may cause interference to radio communication.
In order to guarantee an effective and smooth installation process within the targeted time frame, the following tasks of the checklist below must be carried out prior to the installation of the device.

Check and discuss all the required measures for the installation by means of this checklist. Remarks on the individual items can be noted on the back of the list.

After completion please hand out this checklist to your local Agfa representative:

Name of Field Service Engineer: ___________________ Checking date:____________________

Client name:____________________________________________________________________

Client address:__________________________________________________________________
______________________________________________________________________________

Contact person, name and title:______________________________________________________________________________

Client phone number: ________________________ Extension:_______________________

Type of systems: ____________________ Order /OGT number: ________________________

<table>
<thead>
<tr>
<th>#</th>
<th>Item</th>
<th>Reference</th>
<th>Okay</th>
</tr>
</thead>
<tbody>
<tr>
<td>1</td>
<td>All parts, which are required additionally to the &quot;scope of delivery&quot; are available at the installation site.</td>
<td>4</td>
<td>☐</td>
</tr>
<tr>
<td>2</td>
<td>The planned installation place has enough space for installation, operation and repair.</td>
<td>5</td>
<td>☐</td>
</tr>
<tr>
<td>3</td>
<td>The ambient conditions are within the given limits.</td>
<td>6.4</td>
<td>☐</td>
</tr>
<tr>
<td>4</td>
<td>The electrical connection is available as specified.</td>
<td>7</td>
<td>☐</td>
</tr>
<tr>
<td>5</td>
<td>The network is installed and the network administrator is scheduled to setup the digitizer at the network.</td>
<td>7.3</td>
<td>☐</td>
</tr>
<tr>
<td>6</td>
<td>The required system integration parameters are available.</td>
<td>8</td>
<td>☐</td>
</tr>
</tbody>
</table>

Remarks:
______________________________________________________________________________
______________________________________________________________________________
______________________________________________________________________________

Signature of the FSE or Product Specialist:
_________________________________________
Purpose of this document

This document contains explanations of product specific terms and abbreviations used in this service documentation.

Document History

<table>
<thead>
<tr>
<th>Edition.</th>
<th>Release Date</th>
<th>Changes compared to previous version 1.0</th>
</tr>
</thead>
<tbody>
<tr>
<td>2.0</td>
<td>02-2007</td>
<td>• Only layout changes as this Service Documentation is also valid for CR 75.0 Type 5146/105 (as of SN ≥ 6000).</td>
</tr>
</tbody>
</table>

Referenced Documents

<table>
<thead>
<tr>
<th>Document</th>
<th>Title</th>
</tr>
</thead>
<tbody>
<tr>
<td>Service Bulletin</td>
<td>CR 75.0 Type 5146/105 (as of SN ≥ 6000) introduced, DD+DIS028.07E</td>
</tr>
</tbody>
</table>
WARNING:
Improper operation or service activities may cause damage or injuries.

INSTRUCTION:
(1) Read the "Generic Safety Directions" document
    (see MEDNET GSO => General Info => Agfa HealthCare => Publications =>
    Service Manual) prior to attempting any operation, repair or maintenance task on
    the equipment.
(2) Strictly observe all safety directions within the "Generic Safety Directions" and
    on the product.
## Glossary

<table>
<thead>
<tr>
<th>Term</th>
<th>Short Description</th>
</tr>
</thead>
<tbody>
<tr>
<td>µGy</td>
<td>Micro Gray – x-ray dose&lt;br&gt;1Gy = 0.87 x 10⁻² J/kg</td>
</tr>
<tr>
<td>A / D Converter</td>
<td>Analog Digital Converter; the part that translates an analog signal into a digital signal, which can be handled by computers.</td>
</tr>
<tr>
<td>ADC</td>
<td>Agfa Diagnostic Center</td>
</tr>
<tr>
<td>AE – title</td>
<td>Application Entity</td>
</tr>
<tr>
<td>AOS</td>
<td>Adonis Operating System&lt;br&gt;Operating system for Agfa CPU's (Gemini, Goliath, David)</td>
</tr>
<tr>
<td>APIP</td>
<td>Agfa Picture Archiving Protocol</td>
</tr>
<tr>
<td>AUI</td>
<td>Attachment Unit Interface (External „Box“ to connect to a network)</td>
</tr>
<tr>
<td>AS</td>
<td>Archive Station</td>
</tr>
<tr>
<td>BOL</td>
<td>Begin Of Line; Sensor for exact positioning the scan surface along the x-axis. A PIN diode is hit by the laser beam before it reaches the image plate. The Pin diode creates a digital signal, called begin of line signal. The distance (time) between this signal and the IP must be adjusted.</td>
</tr>
<tr>
<td>BOS</td>
<td>Begin Of Scan;</td>
</tr>
<tr>
<td>Browser</td>
<td>Software that provides an interface to the World Wide Web</td>
</tr>
<tr>
<td>BSP</td>
<td>Boot Support Package: boot program for Agfa CPU’s</td>
</tr>
<tr>
<td>Calibration</td>
<td>Procedure on ADC to make a homogeneous exposure look like one on film. Algorithm to counterbalance irregularities in the scanner of ADC.</td>
</tr>
<tr>
<td>CAS</td>
<td>Clinical Application Specialist</td>
</tr>
<tr>
<td>CCM</td>
<td>Configuration and Customization Manager (Tool to edit the configuration file adc.cpf)</td>
</tr>
<tr>
<td>CHM</td>
<td>Cassette Handling Module</td>
</tr>
<tr>
<td>Collimation</td>
<td>Determination of the region in the image where the interesting data is at. On that region the image processing is applied.</td>
</tr>
<tr>
<td>Controller</td>
<td>Is connected ahead the laser recorder. The controller is responsible for the image reception from the diagnostic equipment, the image processing, layout of the images on the film, and image transmission to the machine.</td>
</tr>
<tr>
<td>cPCI</td>
<td>compact Peripheral Component Interconnect – bus system used in CR85-X</td>
</tr>
<tr>
<td>Term</td>
<td>Short Description</td>
</tr>
<tr>
<td>--------------------</td>
<td>--------------------------------------------------------------------------------------------------------------------------------------------------</td>
</tr>
<tr>
<td>CPF – file</td>
<td>Customization Parameter File; file that contains settings for all parameters that can be modified to configure an ADC System according to local needs.</td>
</tr>
<tr>
<td>CPU</td>
<td>Central Processing Unit.</td>
</tr>
<tr>
<td>CR</td>
<td>Computed Radiography</td>
</tr>
<tr>
<td>CR Quality System</td>
<td>Agfa's CR Modality workstation software</td>
</tr>
<tr>
<td>CU-Filter</td>
<td>Copper Filter, used for control of image quality</td>
</tr>
<tr>
<td>DAC</td>
<td>Digital Analog Converter</td>
</tr>
<tr>
<td>Decomposition</td>
<td>The original image is being split up in a set of bandpass-filtered images</td>
</tr>
<tr>
<td>Diagnostic Logger</td>
<td>Tool on ADC to keep a lot of reduced images with the corresponding image data on the HD.</td>
</tr>
<tr>
<td>DICOM</td>
<td>Digital Imaging and Communications in Medicine;</td>
</tr>
<tr>
<td>Dose, x-ray dose</td>
<td>= kV x mA x sec see also µGy = Micro Gray</td>
</tr>
<tr>
<td>Dosimeter</td>
<td>Device to measure x-ray dose</td>
</tr>
<tr>
<td>DR</td>
<td>Direct Radiography</td>
</tr>
<tr>
<td>DRA</td>
<td>Direct Remote Access (external product name: AGFATEC LINK)</td>
</tr>
<tr>
<td>Dynamic Range</td>
<td>Exposure range in which ADC can get usable image data.</td>
</tr>
<tr>
<td>Ethernet</td>
<td>A network standard for the hardware and data link levels.</td>
</tr>
<tr>
<td>FSE</td>
<td>Field Service Engineer</td>
</tr>
<tr>
<td>FTP</td>
<td>File Transfer Protocol. The Internet service that transfers files from one computer to another. (Program used for transmission of files in the Internet)</td>
</tr>
<tr>
<td>Grid</td>
<td>to reduce scattered radiation to increase sharpness</td>
</tr>
<tr>
<td>GSC</td>
<td>Global Support Center</td>
</tr>
<tr>
<td>GUI</td>
<td>Graphical User Interface</td>
</tr>
<tr>
<td>HT power supply</td>
<td>High Tension power supply</td>
</tr>
<tr>
<td>HCP</td>
<td>Hard Copy Printer</td>
</tr>
<tr>
<td>HDD</td>
<td>Hard Disk Drive</td>
</tr>
<tr>
<td>Heel Effect</td>
<td>inhomogeneous exposure</td>
</tr>
</tbody>
</table>

**Glossary**

**DOCUMENT CONTROL NOTE:**
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<table>
<thead>
<tr>
<th>Term</th>
<th>Short Description</th>
</tr>
</thead>
<tbody>
<tr>
<td>HiRes</td>
<td>High Resolution: pixel size = 100 micrometer</td>
</tr>
<tr>
<td>HIS</td>
<td>Hospital Information System</td>
</tr>
<tr>
<td>Histogram</td>
<td>graphical display of the distribution of gray levels</td>
</tr>
<tr>
<td>HUB (Ethernet)</td>
<td>box to interconnect network hosts with Twisted Pair cable. Also called concentrator.</td>
</tr>
<tr>
<td>HUB (in AGFA devices)</td>
<td>Switchbox (Hard- or Software) which switches or multiplexes different channels, e.g. AMDI and Service Channel.</td>
</tr>
<tr>
<td>I/O BUS</td>
<td>Input / Output BUS. System consisting of a defined cable, cable connection, and signal for the parallel transmission of control data. The machine uses a bus system of 8 V level and 26 parallel lines.</td>
</tr>
<tr>
<td>ID Station</td>
<td>IDENTIFICATION Station</td>
</tr>
<tr>
<td>IMOS</td>
<td>IMAGE MONITOR SOFTWARE → succession for SMA</td>
</tr>
<tr>
<td>Internet</td>
<td>The global computer network, composed of thousands of Wide Area Networks (WANs) and Local Area Networks (LANs), that uses TCP/IP to provide world-wide communication to homes, schools, businesses, and governments. The World Wide Web runs on the Internet.</td>
</tr>
<tr>
<td>IP</td>
<td>for ADC: Image Plate (phosphor plate)</td>
</tr>
<tr>
<td>IP</td>
<td>Image Processing</td>
</tr>
<tr>
<td>IP</td>
<td>(Internet Protocol) Internet software that divides data into packets for transmission over the Internet. Computers must run IP to communicate across the Internet. See also TCP.</td>
</tr>
<tr>
<td>IP-Address</td>
<td>(Internet Protocol Address) The standard method which identifies an internet connected computer.</td>
</tr>
<tr>
<td>Java</td>
<td>A general-purpose programming language created by Sun Microsystems. Java can be used to create Java applets. A Java program is downloaded from the Web server and interpreted by a program running on the machine containing the Web browser.</td>
</tr>
<tr>
<td>Java applet</td>
<td>A short program written in Java that is attached to a World Wide Web page and executed by the browser machine.</td>
</tr>
<tr>
<td>JavaScript</td>
<td>A cross-platform, World Wide Web scripting language developed by Netscape Communications. JavaScript code is inserted directly into the HTML page.</td>
</tr>
<tr>
<td>LAN</td>
<td>Local Area Network. Network technology, designed to connect computers over short distances. It is possible to connect the LAN with the Internet or to make a configuration into an intranet.</td>
</tr>
<tr>
<td>Laser</td>
<td>Light Amplification by Stimulated Emission of Radiation:</td>
</tr>
<tr>
<td>Term</td>
<td>Short Description</td>
</tr>
<tr>
<td>-------------------</td>
<td>------------------------------------------------------------------------------------</td>
</tr>
<tr>
<td>LCD</td>
<td>Liquid Crystal Display</td>
</tr>
<tr>
<td>LED</td>
<td>Light Emitting Diode; Semi conductor emitting light</td>
</tr>
<tr>
<td>Leeds Phantom</td>
<td>Image Plate to check the technical image quality of the ADC. The Leeds Phantom was developed for Agfa by the University of Leeds.</td>
</tr>
<tr>
<td>Low Pass Filtering</td>
<td>Butterworth filter in SAB – board to eliminate frequencies &gt; 250 kHz.</td>
</tr>
<tr>
<td>LUT</td>
<td>Look Up Table</td>
</tr>
<tr>
<td>MD – Plate</td>
<td>AGFA MD (\rightarrow) Medium Definition Image Plate</td>
</tr>
<tr>
<td>MFA</td>
<td>Machine Factor A</td>
</tr>
<tr>
<td></td>
<td>Machine specific value indicating the photo multiplier sensitivity</td>
</tr>
<tr>
<td></td>
<td>MFA is the log of the PM high voltage which results in a scan average level SAL1800 at a given dose of 1mR (~20 µGy) and a speed class 200</td>
</tr>
<tr>
<td>MFB</td>
<td>Machine Factor B</td>
</tr>
<tr>
<td>MIMOSA</td>
<td>Medical IMage Operating System Agfa; Agfa's workstation operating software</td>
</tr>
<tr>
<td>MODEM</td>
<td>MODULATOR DEMODULATOR – device to connect via telephone line to another computer.</td>
</tr>
<tr>
<td>Monitor – level</td>
<td>lowest software level on CPU (like BIOS on DOS systems) stored on EEPROM</td>
</tr>
<tr>
<td>mR</td>
<td>milli Röntgen, measure for x-ray dose</td>
</tr>
<tr>
<td></td>
<td>1 mR corres. 8.7 µGy</td>
</tr>
<tr>
<td>MS-Board</td>
<td>Multy Supply Board; is part of the Power Unit, detects supply voltage, controls the mechanical peryiphery of the digitizer and protects the stepper motor boards.</td>
</tr>
<tr>
<td>MUSICA</td>
<td>MUltiple Scale Image Contrast Amplification; Agfa's image processing software</td>
</tr>
<tr>
<td>Network location</td>
<td>In a URL, the unique name that identifies an Internet server. A network location has two or more parts, separated by periods, as in my.network.location. Also called host name and Internet address.</td>
</tr>
<tr>
<td>Node</td>
<td>Nodes in the I/O bus system = printed circuit board in the I/O bus.</td>
</tr>
<tr>
<td>Nullmodem</td>
<td>RS 232 (RS242) cable with crossed Transmit / Receive Line</td>
</tr>
<tr>
<td>NVE</td>
<td>Name value file editor; editor system for parameter</td>
</tr>
<tr>
<td>Term</td>
<td>Short Description</td>
</tr>
<tr>
<td>--------------------------</td>
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</tr>
<tr>
<td>NX</td>
<td>NX is Agfa’s new standalone CR workstation for: image acquisition, identification, image processing and image transmission of digitized images received from a digitizer. It prepares these images for diagnostic use and sends them to a printer, an archive or a diagnostic station</td>
</tr>
<tr>
<td>OBERON board</td>
<td>CPU in Agfa digitizers, successor of ARIEL board</td>
</tr>
<tr>
<td>OLUT</td>
<td>Output Look-Up Table</td>
</tr>
<tr>
<td>OS</td>
<td>Operating System</td>
</tr>
<tr>
<td>Password</td>
<td>A text string that allows a user access to an Internet service, if the service requires it.</td>
</tr>
<tr>
<td>Photomultiplier Tube (PMT)</td>
<td>Photo Multiplier Tube: opto – electronical sensitive device to convert light (laser emission) in current and with a I / V – Converter into voltage</td>
</tr>
<tr>
<td>Pixel</td>
<td>Scanning point on the film or plate. A maximum of 2048 per line may be read by the Photomultiplier.</td>
</tr>
<tr>
<td>Preview Monitor</td>
<td>displays the image and the name of the patient. This monitor enables to roughly check whether the exposure was successful.</td>
</tr>
<tr>
<td>PRID</td>
<td>PREVIEW and ID Station, installed on one PC, used on older CR systems, current CR QS systems use the ID viewer software</td>
</tr>
<tr>
<td>PS</td>
<td>Processing Station</td>
</tr>
<tr>
<td>Pyramidal Image</td>
<td>Image file format of images on VIPS</td>
</tr>
<tr>
<td>Quantisation</td>
<td>compression of image files</td>
</tr>
<tr>
<td>RAM</td>
<td>Random Access Memory volatile main memory of computers</td>
</tr>
<tr>
<td>RAM – DISK</td>
<td>virtual harddisk simulated in the CPU main memory Gemi on RAM-Disk contains all the machine dependent parameters, e.g. stepper motor steps, info counters</td>
</tr>
<tr>
<td>REM Tool</td>
<td>Debugging tool for AOS logfiles</td>
</tr>
<tr>
<td>Reset</td>
<td>Machine reset into a defined machine status. Various checking routines are carried out during a reset.</td>
</tr>
<tr>
<td>RIS</td>
<td>Radiology Information System</td>
</tr>
<tr>
<td>ROI</td>
<td>Region Of Interest</td>
</tr>
<tr>
<td>ROM</td>
<td>Read Only Memory</td>
</tr>
<tr>
<td>RS232 interface</td>
<td>Serial interface which converts computer internal parallel information into serial bits, and vice versa.</td>
</tr>
<tr>
<td>Term</td>
<td>Short Description</td>
</tr>
<tr>
<td>--------------</td>
<td>---------------------------------------------------------------------------------------------------------------------------------------------------</td>
</tr>
</tbody>
</table>
| SAL          | Scan Average Level  
Digitized photo multiplier signal of an average of several hundred scanned lines  
Range SAL0 – SAL4095 (12bit)                              |
| SCP          | SOFTCOPY Tool                                      |
| SCSI         | Small Computer Systems Interface – interface to connect peripherals to computers  
e.g. HDD, CD-ROM)  |
| Server       | A computer that shares its resources, such as printers and files, with other computers on the network.                                      |
| Service interface | RS232 standard interface for the connection of the Service PC.                                    |
| Shading Calibration | position dependent sensitivity calibration; calibration of each pixel in a line                                             |
| Shell        | User Interface of the VME – AOS                                                                                                                  |
| Slowscan direction | Transport Direction of Image Plate through the scan unit.  
The stepper motor speed is calculated such that the distance between two scan lines equals the distance between two pixels in a line. |
| Speed Class (SC) | Dose=1mR + SC100 => D=1 above fog + base  
A film-screen-system with speed class 100 which is exposed with a dose of 1mR results in a density 1 above fog+base. |
| Square Root Compression | Signal $\sim \frac{1}{\sqrt{N}}$.  
Method to quantisize Signal in 12 similar block sizes |
| Standard Res | Standard Resolution: pixel size = 150 micrometer                                                  |
| Subnet number | A part of the internet address which designates a subnet                                       |
| TCP          | Transmission Control Protocol. Internet networking software that controls the transmission of packets of data over the Internet. Among its tasks, TCP checks for lost packets, puts the data from multiple packets into the correct order, and requests that missing or damaged packets be resent. Computers must run TCP to communicate with World Wide Web servers. |
| Text Field   | Part of the film displaying patient, hospital and image processing information                |