

CR 35 NDT Plus

HD-CR 35 NDT Plus



EN Installation and operating instructions



The current version of the installation and operating instructions is available in the Download Center:



<http://q-r.to/CR35NDT>

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 **Important information**

1 About this document

These installation and operating instructions represent part of the unit.



Failure to comply with the instructions and information in these installation and operating instructions means that Dürr NDT will not be able to offer any warranty or assume any liability for the safe operation and the safe functioning of the unit.

The German version of the installation and operating instructions is the original manual. All other languages are translations of the original manual. These installation and operating instructions apply to:

CR 35 NDT

Order number: 2134-000-60

HD-CR 35 NDT Plus

Order number: 2134-000-61

1.1 Warnings and symbols

Warnings

The warnings in this document are intended to draw your attention to possible injury to persons or damage to machinery.

The following warning symbols are used:



General warning symbol

The warnings are structured as follows:



SIGNAL WORD

Description of the type and source of danger

Here you will find the possible consequences of ignoring the warning

- › Follow these measures to avoid the danger.

The signal word differentiates between four levels of danger:

- **DANGER**
Immediate danger of severe injury or death
- **WARNING**
Possible danger of severe injury or death
- **CAUTION**
Risk of minor injuries
- **NOTICE**
Risk of extensive material/property damage

Other symbols

These symbols are used in the document and on or in the unit:



Note, e.g. specific instructions regarding efficient and cost-effective use of the unit.



CE labelling



Conformity mark for the United Kingdom of Great Britain and Northern Ireland



Manufacturer



Date of manufacture



Dispose of correctly in accordance with EU Directive 2012/19/EU (WEEE).



Do not reuse



Wear protective gloves.



Disconnect all power from the unit.



Refer to the accompanying electronic documents.



Observe the operating instructions.




Order number



Serial number



Lot designation

-  Warning – dangerous high voltage
-  Warning - laser beam
-  Lower and upper temperature limits
-  Upper temperature limit
-  Keep dry
-  This way up / store and transport in an upright position
-  Fragile, handle with care
-  Keep away from sunlight
-  Stacking limits
-  Do not roll
-  Recycling
-  ETL Certification
CONFORMS TO UL STD 61010-1
CERTIFIED TO CAN/CSA STD C22:2 NO.
61010-1

1.2 Label

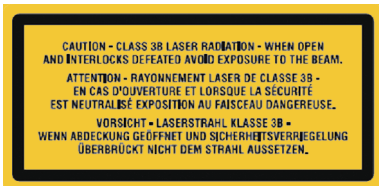
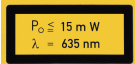
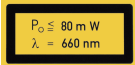



Fig. 1: Laser class 3B



Fig. 2: Warning – laser beams

-  Information about the laser source
-  Information about the laser source
-  Danger to components due to electrostatic discharge (ESD)

1.3 Copyright information

All names of circuits, processes, names, software programs and units used in this document are protected by copyright.

The Installation and Operating Instructions must not be copied or reprinted, neither in full nor in part, without written authorisation from Dürr NDT.

2 Safety

DÜRR NDT has designed and constructed this unit so that when used in accordance with its Intended Use there is no danger to people or property.

Despite this, the following residual risks can remain:

- Personal injury due to incorrect use/misuse
- Personal injury due to mechanical effects
- Personal injury due to electric shock
- Personal injury due to radiation
- Personal injury due to fire
- Personal injury due to thermal effects to skin

2.1 Intended use

The unit is intended solely for use in an industrial setting for the scanning and processing of image data on an image plate.

2.2 Improper use

Any use of this appliance / these appliances above and beyond that described in the Installation and Operating Instructions is deemed to be incorrect usage. The manufacturer cannot be held liable for any damage resulting from incorrect usage. The operator will be held liable and bears all risks.



WARNING

Risk of explosion due to ignition of combustible materials

- › Do not operate the unit in any rooms in which inflammable mixtures may be present, e.g. in operating theatres.

The unit is not designed for applications in the fields of human medicine or veterinary medicine. The preview of the X-ray image on the touch screen is not suitable for the purposes of diagnosis.

2.3 General safety information

- › Always comply with the specifications of all guidelines, laws, and other rules and regulations applicable at the site of operation for the operation of this unit.
- › Check the function and condition of the unit prior to every use.
- › Do not convert or modify the unit.
- › Comply with the specifications of the Installation and Operating Instructions.

- › The Installation and Operating Instructions must be accessible to all operators of the unit at all times.

2.4 Specialist personnel

Operation

Unit operating personnel must ensure safe and correct handling based on their training and knowledge.

- › Instruct or have every user instructed in handling the unit.

Installation and repairs

- › All installation, resetting, alteration, extension and repair work must be carried out either by DÜRR NDT personnel or by a suitably qualified person approved by DÜRR NDT.

2.5 Electrical safety

- › Observe and comply with all the relevant electrical safety regulations when working on the unit.
- › Replace any damaged cables or plugs immediately.

2.6 Only use original parts

- › Use only those accessories and optional accessories specified or approved by DÜRR NDT.
- › Only use only original wear parts and replacement parts.



DÜRR NDT accepts no liability for damage or injury resulting where accessories or special accessories or where non-original parts or spare parts not specifically approved have been used.

2.7 Transport

The original packaging provides optimum protection for the unit during transport.

Original packing for this unit can be ordered from DÜRR NDT as required.



DÜRR NDT does not accept liability for any damage to the unit resulting from transport in unsuitable packaging, even during the guarantee period.

- › Only transport the unit in its original packaging.
- › Keep the packing materials out of the reach of children.
- › Do not expose the unit to any strong vibrations or shocks.

2.8 Disposal



Dispose of correctly in accordance with EU Directive 2012/19/EU (WEEE).



An overview of the waste keys for DÜRR NDT products can be found in the download area at www.duerr-ndt.de (document no. GA10100002).

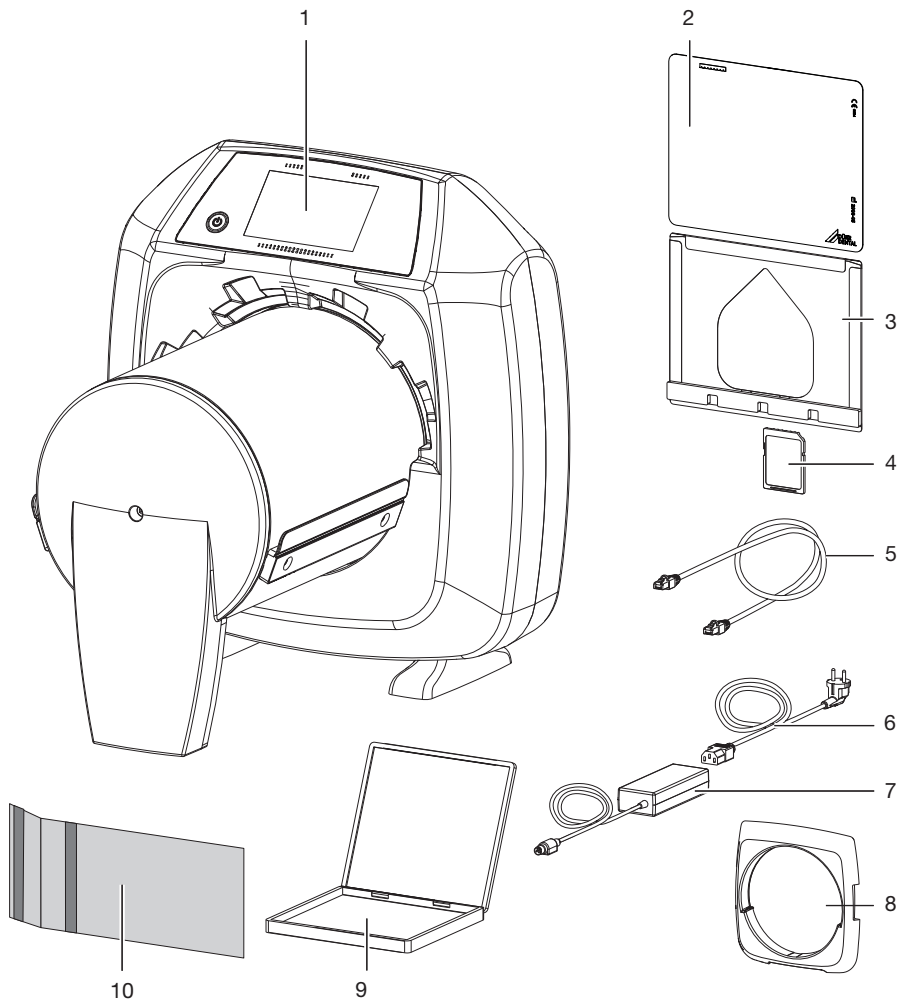
2.9 Protection from threats from the Internet

The unit is to be connected to a computer that can be connected to the Internet. Therefore, the system needs to be protected from threats from the Internet.

- › Use antivirus software and update it regularly. Look for evidence of possible virus infection and, if applicable, check with the antivirus software and remove the virus.
- › Perform regular data backups.
- › Restrict access to units to trustworthy users, e.g. via a user name and password.
- › Make sure that only trustworthy content is downloaded. Only install software and firmware updates that have been authenticated by the manufacturer.

 Product description

3 Overview



- 1 CR 35 NDT Plus / HD-CR 35 NDT Plus Image Plate Scanner
- 2 Image plate
- 3 CR 35 Image plate cassette
- 4 SDHC memory card
- 5 Network cable

- 6 Mains cable
- 7 Power supply unit
- 8 Light protection screen (mounted on device)
- 9 NDT plastic cassette
- 10 CR 35 flexible cassette

3.1 Scope of delivery

The following items are included in the scope of delivery (possible variations due to country-specific requirements and/or import regulations):

**CR 35 NDT Plus
image plate scanner 2134-60**

- CR 35 NDT basic unit
- Network cable
- SDHC memory card
- Stylus
- Power supply unit
- Mains cable (country specific)
- IP Cleaning Wipes
- Installation and operating instructions
- Quick start instructions

**HD-CR 35 NDT Plus
image plate scanner 2134-61**

- HD-CR 35 NDT basic unit
- Network cable
- SDHC memory card
- Stylus
- Power supply unit
- Mains cable (country specific)
- IP Cleaning Wipes
- Installation and operating instructions
- Quick start instructions

3.2 Accessories



Further items on request.

The following items are required for operation of the device, depending on the application:

Image plates

Normal resolution (not available on the USA market):

- CR-IP image plate 6x24 cm
- CR-IP image plate 6x48 cm
- CR-IP image plate 10x24 cm
- CR-IP image plate 10x48 cm
- CR-IP image plate 18x24 cm
- CR-IP image plate 24x30 cm
- CR-IP image plate 30x40 cm
- CR-IP image plate 35x43 cm

High resolution (not available on the USA market):

- HD-IP Plus image plate 6x24 cm
- HD-IP Plus image plate 6x48 cm
- HD-IP Plus image plate 10x24 cm
- HD-IP Plus image plate 10x48 cm
- HD-IP Plus image plate 18x24 cm
- HD-IP Plus image plate 24x30 cm
- HD-IP Plus image plate 30x40 cm
- HD-IP Plus image plate 35x43 cm

Normal resolution (H CR):

- HCR image plate 10x24 cm
- HCR image plate 10x48 cm
- HCR image plate 18x24 cm
- HCR image plate 24x30 cm
- HCR image plate 35x43 cm

High resolution (X CR):

- XHD image plate 10x24 cm
- XHD image plate 10x48 cm
- XHD image plate 18x24 cm
- XHD image plate 24x30 cm
- XHD image plate 35x43 cm

Highly sensitive (G CR):

- GCR image plate 10x24 cm
- GCR image plate 10x48 cm
- GCR image plate 18x24 cm
- GCR image plate 24x30 cm
- GCR image plate 35x43 cm

Light protection covers

- Light protection covers 10x24 cm / 4.5x10 in
- Light protection covers 10x48 cm / 4.5x17 in

3.3 Optional items



Further items on request.

The following optional items can be used with the device:

- SDHC memory card 9000-134-18
- Network cable (5 m) 9000-118-036
- CR 35 Guidance (metric) 2134-105-00

imaging software

- D-Tect Basic 2134-725-02
- D-Tect X-ray module image plate scanner 2134-725-04
- D-Tect DICONDE 2134-725-05
- D-Tect adapted report 2134-725-08

D-Tect Viewer	2134-725-09
D-Tect measuring tool (wall thickness and corrosion)	2134-725-10
D-Tect PT Tool	2134-725-11
D-Tect X Basic	DTEC100001
D-Tect X measuring tool (wall thickness)	DTEC100003
D-Tect X 2 years support and update extension	DTEC100005

CR 35 image plate cassettes

CR 35 Image plate cassette 18x24 cm (1 piece)	2132-023-50
CR 35 Image plate cassette 24x30 cm (1 piece)	2132-021-50
CR 35 Image plate cassette 30x40 cm (1 piece)	2132-022-50
CR 35 Image plate cassette 35x43 cm (1 piece)	2132-024-50

Plastic cassettes

NDT plastic cassette 18x24 cm (1 piece)	KUNK100001
NDT plastic cassette 24x30 cm (1 piece)	KUNK100002
NDT plastic cassette 30x40 cm (1 piece)	KUNK100003
NDT plastic cassette 35x43 cm (1 piece)	KUNK100004

CR 35 flexible cassettes

CR 35 flexible cassette 6x24 cm (1 piece)	NACS0624107
CR 35 flexible cassette 6x48 cm (1 piece)	NACS0648107
CR 35 flexible cassette 10x24 cm (1 piece)	NACS100014
CR 35 flexible cassette 10x48 cm (1 piece)	NACS100015
CR 35 flexible cassette 18x24 cm (1 piece)	NACS1824107
CR 35 flexible cassette 24x30 cm (1 piece)	NACS100016
CR 35 flexible cassette 30x40 cm (1 piece)	NACS100017
CR 35 flexible cassette 35x43 cm (1 piece)	NACS100018



Further cassette formats available on request

3.4 Consumables

The following materials are consumed during operation of the device and must be reordered separately:

Light protection covers

Light protection covers 10x24 cm / 4.5x10 in (1000 pieces) .LIPS100001
Light protection covers 10x48 cm / 4.5x17 in (1000 pieces) .LIPS100002

Cleaning

IP cleaning wipes (10 pcs.)	CCB351A1001
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Further cleaning agents can be obtained from Orochemie (www.orochemie.de).

3.5 Wear parts and replacement parts

Set of light protection brushes	2134-205-00E
Set of vibration reducers	2134-305-00E
Toothed belt set	2134-315-00E
Set of drive belts (4 pieces)	2134-993-50

Image plates

Normal resolution

Not available on the USA market.

CR-IP image plate 6x24 cm (1 piece)	CRIP0624109
CR-IP image plate 6x48 cm (1 piece)	CRIP0648109
CR-IP image plate 10x24 cm (1 piece)	CRIP1024109
CR-IP image plate 10x48 cm (1 piece)	CRIP1048109
CR-IP image plate 18x24 cm (1 piece)	CRIP1824109
CR-IP image plate 24x30 cm (1 piece)	CRIP2430109
CR-IP image plate 30x40 cm (1 piece)	CRIP3040109
CR-IP image plate 35x43 cm (1 piece)	CRIP3543109



Further image plate formats available on request

High resolution

Not available on the USA market.

HD-IP Plus image plate 6x24 cm (1 piece)	HDIP0624108
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HD-IP Plus image plate	
6x48 cm (1 piece)	HDIP0648108
HD-IP Plus image plate	
10x24 cm (1 piece)	HDIP1024108
HD-IP Plus image plate	
10x48 cm (1 piece)	HDIP1048108
HD-IP Plus image plate	
18x24 cm (1 piece)	HDIP1824108
HD-IP Plus image plate	
24x30 cm (1 piece)	HDIP2430108
HD-IP Plus image plate	
30x40 cm (1 piece)	HDIP3040108
HD-IP Plus image plate	
35x43 cm (1 piece)	HDIP3543108

 Further image plate formats available on request

Normal resolution (HCR)

HCR image plate	
10x24 cm (1 piece)	HR1024CM113
HCR image plate	
10x48 cm (1 piece)	HR1048CM113
HCR image plate	
18x24 cm (1 piece)	HR1824CM113
HCR image plate	
24x30 cm (1 piece)	HR2430CM113
HCR image plate	
35x43 cm (1 piece)	HR3543CM113

 Further image plate formats available on request

High resolution (XHD)

XHD image plate	
10x24 cm (1 piece)	XL1024CM113
XHD image plate	
10x48 cm (1 piece)	XL1048CM113
XHD image plate	
18x24 cm (1 piece)	XL1824CM113
XHD image plate	
24x30 cm (1 piece)	XL2430CM113
XHD image plate	
35x43 cm (1 piece)	XL3543CM113

 Further image plate formats available on request

High sensitivity (GCR)


GCR image plate	
10x24 cm (1 piece)	GP1024CM113

GCR image plate	
10x48 cm (1 piece)	GP1048CM113
GCR image plate	
18x24 cm (1 piece)	GP1824CM113
GCR image plate	
24x30 cm (1 piece)	GP2430CM113
GCR image plate	
35x43 cm (1 piece)	GP3543CM113

 Further image plate formats available on request

CR 35 image plate cassettes

see "3.2 Accessories"

 Further information about the replacement parts on demand

4 Technical data

4.1 Image plate scanner

Electrical data for the unit		
Voltage	V DC	24
Max. current consumption	A	5
Output	W	< 120
Electrical data – power supply unit		
Voltage	V AC	100 - 240
Frequency	Hz	50 - 60
Protection class		I
Type of protection		IP20
Output	W	< 140
Max. current consumption	A	2
Classification		
Laser class (unit)		1
In accordance with IEC 60825-1:2007		
Laser source		
Laser class		3B
In accordance with IEC 60825-1:2007		
Wavelength λ	nm	635
Output	mW	\leq 15
Laser source HD-CR 35 NDT Plus		
Laser class		3B
in accordance with EN 60825-1:2007		
Wavelength λ	nm	660
Output	mW	80
Noise level		
Standby	dB(A)	0
Ready to scan	dB(A)	approx. 37
During scanning	dB(A)	approx. 55
General technical data		
Dimensions (W x H x D)	cm	37 x 40 x 47
	in	14.3 x 15.7 x 18.5
Weight	kg	approx. 17.5
	lb	approx. 38.6

General technical data

Max. feeding width for image plates	cm	35.4
	in	13.9
Heat output	W	< 140
Degree of soiling		2
Duty cycle S2 (in accordance with VDE 0530-1)	min	60
Duty cycle S6 (in accordance with VDE 0530-1)	%	70
Max. noise level	db(A)	< 60

Network connection

LAN technology		Ethernet
Standard		IEEE 802.3u
Data rate	Mbit/s	100
Connector		RJ45
Type of connection		Auto MDI-X
Cable type		≥ CAT5

WLAN connection

WLAN technology		IEEE 802.11b/g
Encryption		WPA, WPA2

Memory card

Type		SDHC
Maximum memory capacity	GB	32
File system		FAT32
Performance class	Class	≥ 4

Ambient conditions during operation

Temperature	°C	+10 to +35
	°F	+50 to +95
Relative humidity	%	20 - 90
Air pressure	hPa	750 - 1060

Ambient conditions during storage and transport

Temperature	°C	-20 to 60
	°F	-4 to +140
Relative humidity	%	10 - 95
Air pressure	hPa	750 - 1060

4.2 Image plate

Ambient conditions during operation

Temperature	°C	18 - 45
	°F	64 - 113
Relative humidity	%	< 80

Ambient conditions during storage and transport

Temperature	°C	< 33
	°F	< 91
Relative humidity	%	< 80

4.3 Scanning modes

The scan modes listed are standard configurations. These can be amended as, and if, required. For this reason the listed scan modes can vary from the scan modes actually saved to the appliance. Additionally, not all scan mode values have been listed here. Further information concerning the various scan modes can be obtained by contacting DÜRR NDT.



The basic local resolution can vary depending on the actual x-ray source, exposure conditions and image plate type.

CR 35 NDT Plus

Scan mod name: NDT 50 µm

Pixel size	µm	50
Native laser spot	µm	50
HV	V	620
Laser	Laser level	6
RPM	rpm	3000
Pixel binning		Off

Scan mode name: 100µm White IP - Binning

Pixel size	µm	100
Native laser spot	µm	50
HV	V	620
Laser	Laser level	6
RPM	rpm	3000
Pixel binning		On

HD-CR 35 NDT Plus (TreFoc)

Scan mode name: BAM Certified Mode (15/15/30)

Pixel size	µm	15
Native laser spot	µm	12.5
HV	V	620
Laser	Laser level	6

Scan mode name: BAM Certified Mode (15/15/30)

RPM	rpm	2114
Pixel binning		Off
Basic local resolution	μm	40

Scan mode name: 25μm White IP - Binning

Pixel size	μm	25
Native laser spot	μm	12.5
HV	V	620
Laser	Laser level	6
RPM	rpm	2114
Pixel binning		On

Scan mode name: 25μm Blue IP / High Res White IP

Pixel size	μm	25
Native laser spot	μm	25
HV	V	620
Laser	Laser level	6
RPM	rpm	3000
Pixel binning		Off

Scan mode name: 50μm White IP

Pixel size	μm	50
Native laser spot	μm	50
HV	V	670
Laser	Laser level	6
RPM	rpm	4000
Pixel binning		Off

Scan mode name: 50μm Blue IP / High Res White IP - Binning

Pixel size	μm	50
Native laser spot	μm	25
HV	V	620
Laser	Laser level	6
RPM	rpm	3000
Pixel binning		On

Scan mode name: 100μm White IP - Binning

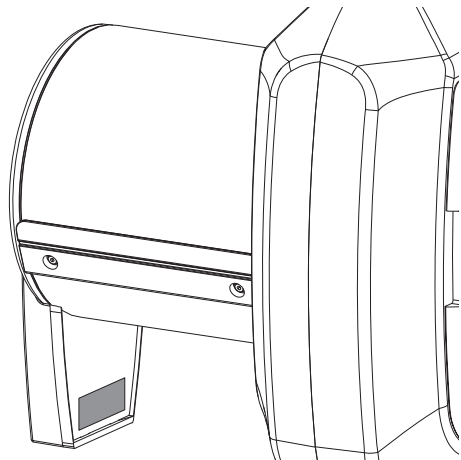
Pixel size	μm	100
Native laser spot	μm	50
HV	V	670

Scan mode name: 100µm White IP - Binning

Lasers	Lasers level	6
RPM	rpm	4000
Pixel binning		On

4.4 Type plate

The type plate is located on the rear side of the foot.



4.5 Evaluation of conformity

This device has been subjected to conformity acceptance testing in accordance with the current relevant European Union guidelines. This equipment conforms to all relevant requirements.

ETL approval

This Class A device complies with Canadian ICES-003.

The 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 unit generates, uses and emits radio frequency energy. If the device is not set up and operated in accordance with the installation and operating instructions, this can lead to interference in radio communications. Operation of the equipment in a residential area may cause malfunctions to occur on the device. The operator will be required to remedy such malfunctions or interference at his own expense.

FDA registration

Complies with FDA performance standards for laser products except for deviations pursuant to Laser Notice No. 50, June 2007.

4.6 Simplified declaration of conformity

WLAN stick

A WLAN stick from a third-party manufacturer is installed in the unit; this stick complies with Directive 2014/53/EU, among others.

Which WLAN stick is installed can be found directly on the WLAN stick. The information is provided on the stick.

The full text of the EU declaration of conformity of the third-party manufacturer can be viewed online at the Download Center:



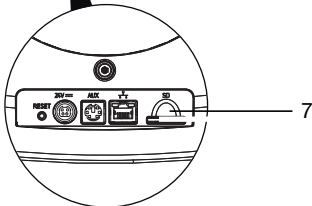
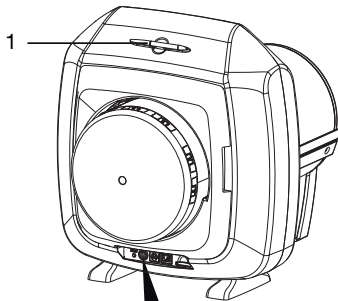
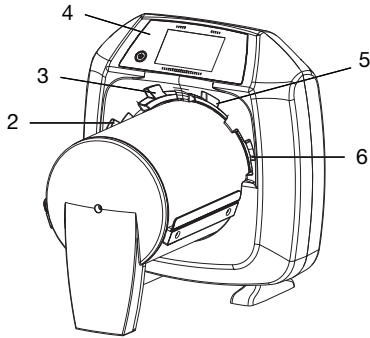
<http://q-r.to/LM816>



<http://q-r.to/WNA3100M>

5 Operation

5.1 Image plate scanner



- 1 Stylus
- 2 + 3 Entry slots
- 4 User interfaces
- 5 + 6 Entry slots
- 7 Memory card slot

The image plate scanner is used to read image data stored on the image plate.

The device can be used in two different ways: via the imaging software on a PC or directly via the touch screen on the unit.

The transport mechanism guides the image plate through the device. The image plate is read using a laser inside the scanner unit. The scanned data is converted into a digital image.

If a scanning task is started via the imaging software, the image is automatically transmitted to the computer.

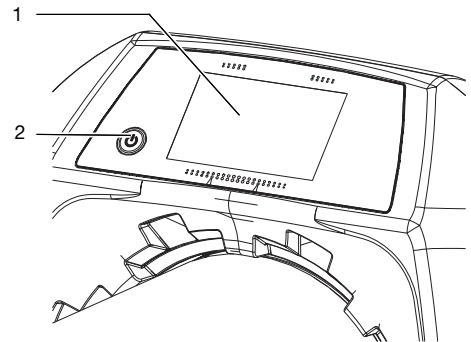
If a scanning task is started via the touch screen, the image is saved to the memory card and then needs to be transferred to the computer.

After scanning, the image plate runs through the erasure unit. Image data still held on the image plate is erased with the aid of bright light.

The image plate is then ejected for re-use.

The unit can scan up to four image plates (depending on the sizes) simultaneously with the same resolution.

Operating elements



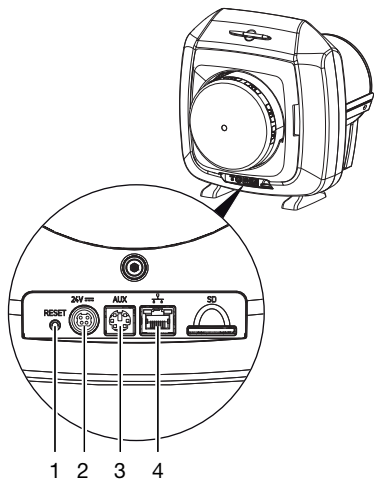
- 1 Touch screen
- 2 On / off switch

The touch screen allows the unit to be operated when it is not connected to a computer. Instructions can be entered on the touch screen either with the tip of a finger or the stylus.

The **Help** button can be used to open a help page for the relevant screen. The **Messages** button can be used to recall current messages.

Connections

The connections are located on the rear of the unit.



- 1 Reset button
- 2 Connection for power supply unit
- 3 AUX connection for diagnostic units
- 4 Network connection with status LED

Exposure recognition

When the exposure recognition is switched on, then the device will detect whether an image plate is exposed or not on insertion. When an exposed image plate is scanned then an X-ray image will be displayed. When an unexposed image plate is scanned then an empty image plate will be displayed. No preview image is displayed on the touch screen

When the exposure recognition is switched off and an unexposed image plate is scanned then the device will not display anything on the touch screen or in the software.

TreFoc

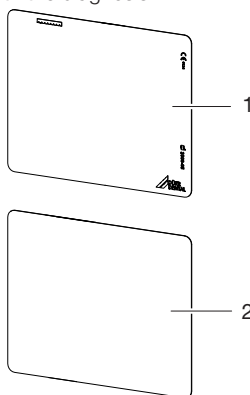
The TreFoc technology of the HD-CR 35 NDT Plus allows the size of the laser spot to be adjusted. This provides X-ray images with optimal signal/noise ratio and optimally adapted resolution. Using the pre-defined scanning mode (see "4.3 Scanning modes") it is able, depending on the particular application, to select the matching scanning mode to suit the image plate.

5.2 Image plate

The image plate stores X-ray energy, which is re-emitted in the form of light after excitation via the laser. This light is then converted to image information in the image plate scanner.

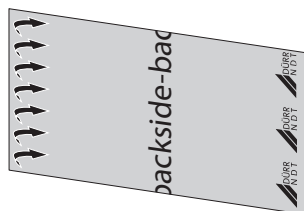
The image plate has an active side and an inactive side. The image plate must always be exposed on the active side.

When used properly, image plates can be exposed, read and erased several hundred times provided there is no mechanical damage. The image plate must be replaced if there are any signs of damage, e.g. if the protective layer is damaged or there are visible scratches that could interfere with the diagnosis.



- 1 Inactive side black, with manufacturer's information printed on it
- 2 Active side white or light blue

5.3 Light protection cover

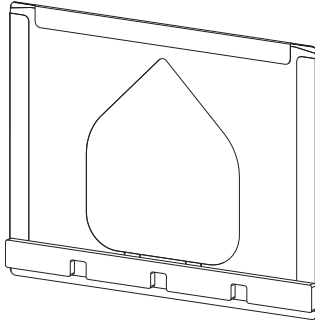


The light protection cover provides several protection functions for the image plate:

- Protection against sunlight and UV light, and therefore protection against accidental erasure
- Protection from dirt

Additionally, the light protection cover with its adhesive strips makes it easier to insert the image plate for scanning. Information on handling can be found in leaflet 9000--608-58. The light protection cover is a disposable item.

5.4 CR 35 image plate cassette

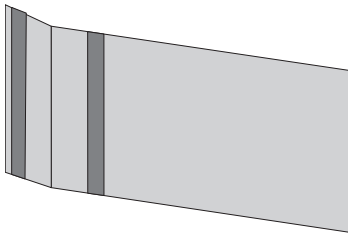


The CR 35 image plate cover provides several protection functions for the image plate:

- Protection against sunlight and UV light, and therefore protection against accidental erasure
- Protection against mechanical damage

The CR 35 image plate cover can be used in non-dirty environments.

5.5 CR 35 flexible cassette

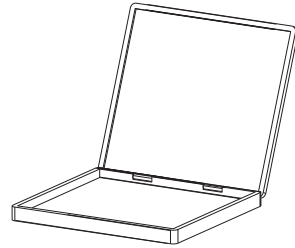


The CR 35 flexible cassette provides several protection functions for the image plate:

- Protection against sunlight and UV light, and therefore protection against accidental erasure
- Protection against mechanical damage
- Protection against contamination and soiling

The CR 35 flexible cassette can be used in wet and dirty environments.

5.6 NDT plastic cassette

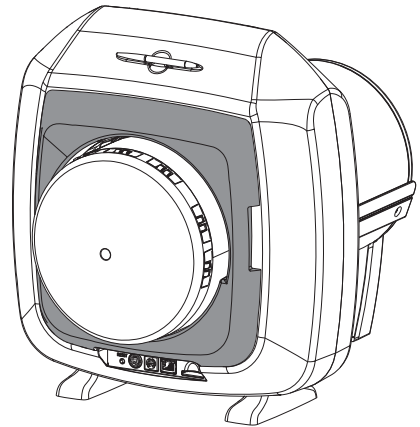


The plastic cassette can be inserted into standard X-ray cassette trays. Additionally, plastic cassettes offer protection against damage.

5.7 Stylus

The touch screen can be operated using the stylus as an alternative to the tip of a finger.

5.8 Light protection screen



The light protection screen reduces the amount of stray light that can enter the device. Additionally the light protection screen hinders the image plate from falling out after scanning is completed.

Assembly

i The installation, connection and commissioning of the device may only be performed by qualified specialists or persons trained by DÜRR NDT.

6 Requirements

6.1 Installation/setup room

The room chosen for set up must fulfil the following requirements:

- Closed, dry, well-ventilated room
- It should not be a room made for another purpose (e.g. boiler room or wet cell).
- Max. light intensity 1000 Lux, no direct sunlight at the place of installation of the unit
- There should be no large fields of interference (e.g. strong magnetic fields) present that can interfere with the correct operation of the unit.
- Refer to the requirements for environmental conditions in "4 Technical data".

6.2 System requirements

i For details of the system requirements for computer systems, refer to the separate information sheet (order number 9000--608--02) or visit the website at www.duerr-ndt.de.

6.3 Monitor

The monitor must comply with the requirements for digital X-ray with a high light intensity and wide contrast range (EN 25580). Strong ambient light, sunlight falling directly onto the monitor and reflections can make it harder or even impossible to perform a diagnosis based on the X-ray images.

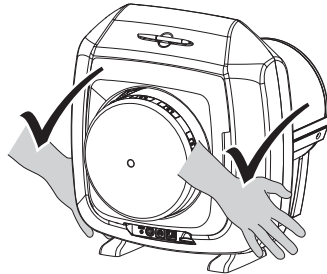
7 Installation

7.1 Carrying the unit

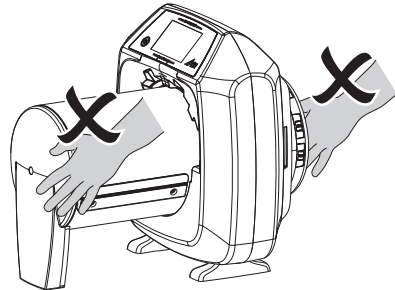
! **NOTICE**
Risk of damage to sensitive components in the unit as a result of shocks or vibrations

- › Do not expose the unit to any strong vibrations or shocks.
- › Do not move the unit during operation.

› When carrying, only lift the unit by the sides of its housing.



› Do not hold the device by its tube.



7.2 Setting up the unit

Portable and mobile HF communication appliances can interfere with the effectiveness of electrical devices.

- › Do not stack the unit next to or together with other appliances.
- › If, however, this unit is operated close to other units or stacked with other units, monitor the unit carefully in the configuration selected in order to ensure normal operation.

The device can be set up on a table.

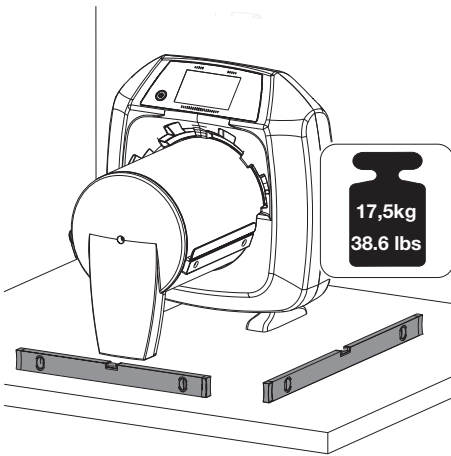
The load-bearing capacity of the table must be suitable for the weight of the unit (see "4.1 Image plate scanner").

Setting the unit on a table



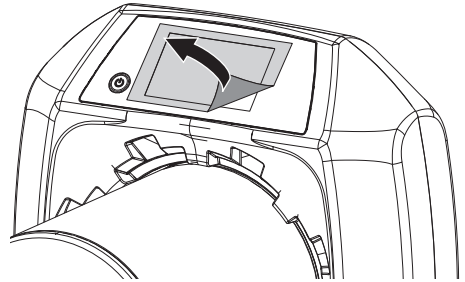
To prevent errors when scanning the image data, install the unit so it is not exposed to vibrations.

- › Place the unit on a firm, horizontal surface.



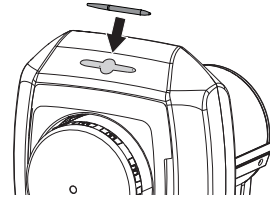
7.3 Removing the protective film from the touch screen

- › Grasp one corner of the protective touch screen film and peel it off carefully.



7.4 Attaching the stylus

- › The stylus is held on the unit by a magnet. Place the stylus in the indentation provided.



7.5 Inserting the memory card

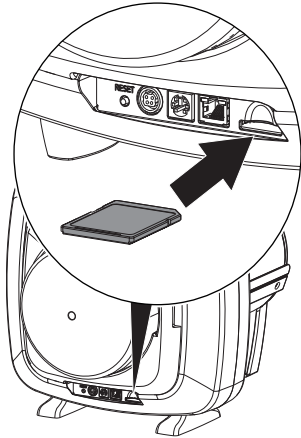


CAUTION

Loss of image data due to unexpected insertion or removal of the memory card

- › Only insert or remove the memory card when unit is switched off.

- › Check whether the memory card has been inserted in the unit correctly. If the memory card has been inserted in the unit incorrectly, take it out again and re-insert it properly.




7.6 Electrical connections

Safety when making electrical connections

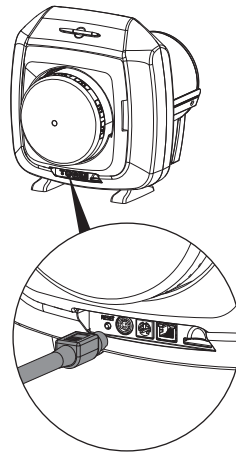
- › The unit must only be connected to a correctly installed power outlet.
- › Make sure that none of the electrical cables leading to the unit are under any mechanical tension.
- › Before initial start-up check that the mains supply voltage and the voltage stated on the type plate match (see also "4. Technical data").

Connecting the unit to the mains supply

-  The device has no main power switch. For this reason the unit must be set up in such a way that the power outlet is easily accessible so that the unit can be unplugged if necessary.

Requirements:

- ✓ Properly installed power outlet close to the unit (max. mains cable length 3 m)
- ✓ Easily accessible power outlet
- ✓ Mains voltage must match the information shown on the type plate of the power supply unit
- › Plug the mains cable (included in the scope of delivery) into the power supply.
- › Plug in the connecting plug of the power supply unit into the socket connection of the device.



- › Plug the mains plug into the power outlet. The connection plug has a lock. To unplug the unit, slide back the plug housing. Do not pull on the cable.

7.7 Connecting the device to the network

Purpose of the network connection

The network connection is used to exchange information or control signals between the unit and a software installed on a computer, in order to, e. g.:

- Display parameters
- Select operating modes
- Indicate messages and error situations
- Change unit settings
- Activate test functions
- Transmit data for archiving
- Provide documents concerning the units

The unit can be connected to the network with a network cable or via WLAN.



For information on connection via WLAN see "8.1 Installing and configuring the unit".

The WLAN functionality can be deactivated in the settings of the unit (see "Configuring WLAN on the unit").

If this is not sufficient, the WLAN stick can also be removed. The unit will continue to function. However, the WLAN functionality is no longer available and cannot be activated in the settings until the WLAN stick is installed again.

To remove the WLAN stick, please contact the customer service.

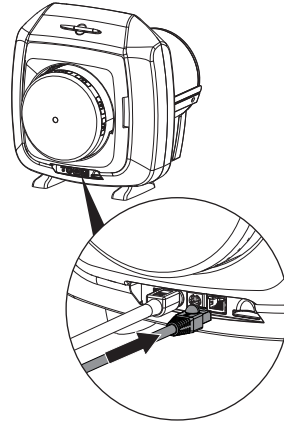
Combining devices safely

Take care when connecting units together or to parts of other systems as there is always an element of risk (e.g. due to leakage currents).

- › Only connect units when there is no danger to the operator or to the environment.
- › Only connect units when it is safe to do so and when there is no risk of damage or harm to the surroundings.
- › If it is not 100% clear from the unit data sheet that such connections can be safely made or if you are in any doubt, always get a suitably qualified person (e.g. the manufacturer) to verify that the setup is safe.
- › Only connect peripheral units (e.g. computer, monitor, printer) that conform at least to the requirements set out in IEC 60950-1 (EN 60950-1).

Connecting the unit via the network cable

- › Connect the supplied network cable to the network connection of the device.



8 Commissioning



NOTICE

Short circuit due to the build up of condensation

- › Do not switch on the unit until it has warmed up to room temperature and it is dry.

8.1 Installing and configuring the unit

The unit supports the following imaging programs:

- D-Tect X
- D-Tect

Configuring the network

- › Switch on the network devices (router, PC, and switch).
- › Check that TCP port 2006 and UDP port 514 are enabled in the firewall; enable them if necessary.
If you are using the Windows firewall, you do not need to check the ports since you will be asked whether you want to enable them during the driver installation process.



When the unit is first connected to a computer, it applies the language and time settings of the computer.

Network configuration

Various options are available for network configuration:

- ✓ Automatic configuration via DHCP.
- ✓ Automatic configuration via Auto-IP for direct connection of unit and computer.
- ✓ Manual configuration.
- › Configure the network settings of the unit via the software.
- › Check the firewall and release the ports, if applicable.

Network protocols and ports

Port	Purpose	Service
45123 UDP, 45124 UDP	Unit recognition and configuration	
2006 TCP	Unit data	
514 ¹⁾ UDP	Event protocol data	Syslog

Port	Purpose	Service
2005 TCP, 23 TCP	Diagnosis	Telnet, SSH

- 1) The port can vary depending on the configuration.

Configuring WLAN on the unit

If the unit is to be operated via WLAN, the connection to the unit needs to be configured.



In order to establish a secure WLAN connection, we recommend encrypting the WLAN network with WPA2.

The quality and transmission range of the WLAN connection can be reduced by environmental conditions (e.g. thick walls, other WLAN devices). When selecting a suitable location for set up, take the signal strength into consideration.

Requirements:

- ✓ You need to be logged-in on the unit as Administrator or Service Technician (**Settings** > **Access Levels** > **Administrator/Service Technician**).
- › Check the WLAN settings with you Network Administrator.
- › Tap the following on the touch screen: **Settings** > **System Settings** > **Network**.
- › Under **Interface** select the option **WLAN** and confirm with **OK**.
- › Configure the WLAN.
- › Confirm with **OK**.

Configuring the unit in D-Tect X

Configuring is carried out entirely on the unit.

- › Tap the following on the touch screen: **Settings** > **System Settings** > **Network**.

Entering a permanent IP address (recommended)



To reset the network settings, keep the unit reset key pressed for 15 - 20 seconds while switching on.

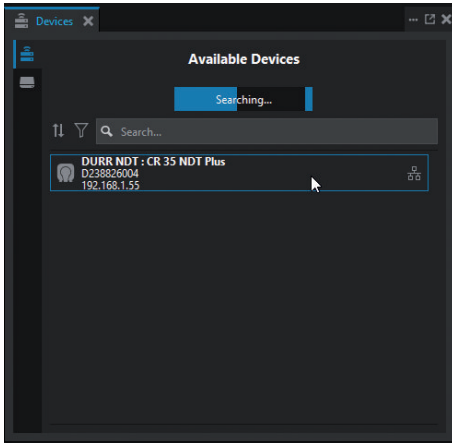
- › Deactivate **DHCP**.
- › Enter the IP address, subnet mask and gateway.

- › Click on *Apply*.
The configuration is saved.

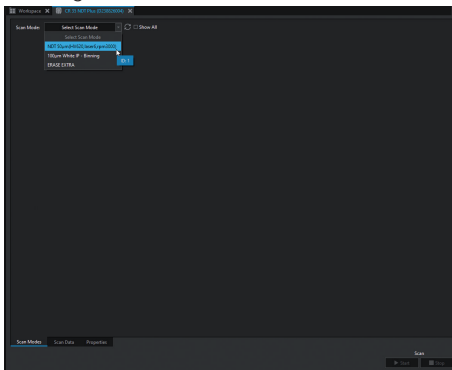
Testing the device

You can scan in an X-ray image to check that the unit is properly connected.

- › Select Dock *Units*.



- › Double-click on the unit in the selection list.
- › Change to the *Units* tab.

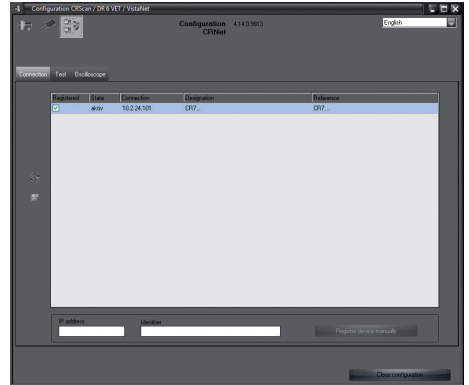



- › Select the scanning mode.
- › Click *Start*.
- › Scan an image plate, see "Scanning the image plate".

Configuring the unit in D-Tect

Configuring is carried out using CRNetConfig, which is automatically installed on installation of D-Tect.

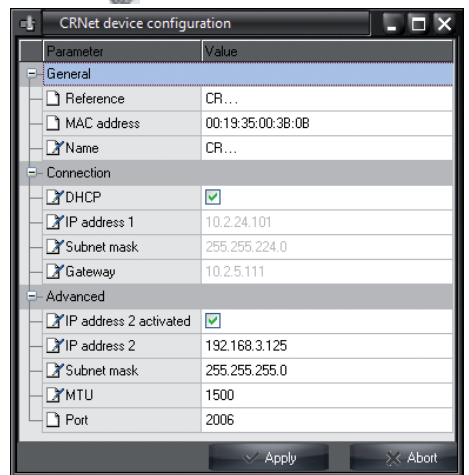
- › Select *Start > All Programs > Dürer NDT > CRScan > CRNetConfig*.



- › Click .
- The list of connected units is updated.
- › Activate the connected unit in the *Registered* column.
- You can also register multiple units.

In the window *CRNet device configuration* you can change the device name (*designation*), manually enter an IP address and query information.

- › Click on .



Entering a permanent IP address (recommended)

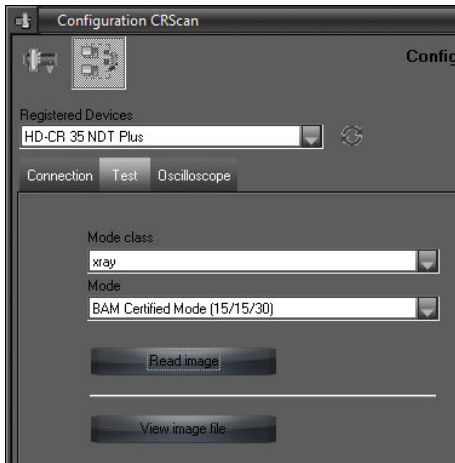
i To reset the network settings, keep the unit reset key pressed for 15 - 20 seconds while switching on.

- › Deactivate *DHCP*.
- › Enter the IP address, subnet mask and gateway.
- › Click on *Apply*.
The configuration is saved.

Testing the device

You can scan in an X-ray image to check that the unit is properly connected.

- › Select the *Test* tab.



- › Select the unit from the *Registered Units* list.
- › Select the mode class.
- › Select the mode.
- › Click on *Scan Image*.
- › Scan an image plate, see "11.2 Scanning the image data via a computer".

8.2 Acceptance tests

The required tests (e.g. acceptance tests) must be carried out in accordance with local rules and regulations.

- › Find out which tests are required.
- › Carry out testing in accordance with local rules and regulations.

Electrical safety checks

- › Carry out the necessary electrical safety checking in accordance with national law (e.g. housing leakage current).
- › Document the results.

 Usage

9 Operating the touch screen

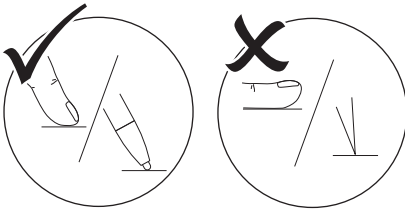


NOTICE

Damage to the touch screen due to incorrect handling

- › Only operate the touch screen using your fingertips or the stylus.
- › Do not use a sharp instrument (e.g. ballpoint pen) to operate the touch screen.
- › Protect the touch screen against water.

- › Operate the touch screen by tapping it with a fingertip or the stylus to select a menu or input field.





- › For further information about any window tap on the *Help* field.

9.1 Navigating


If the contents of the window cannot be completely displayed on the touch screen, a scroll bar appears.

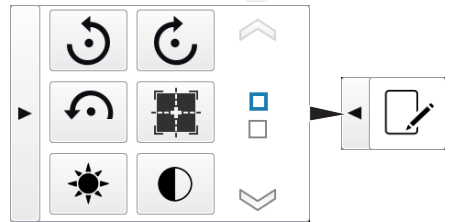


- › Tap  or  to move the displayed section of the window.

9.2 Using menus

The menus integrated in the main window contain additional commands, which can be selected as required.

- › To open the menu, touch .

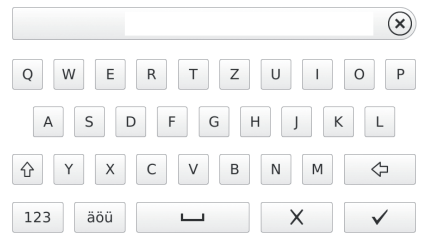










- › Select a command.

9.3 Entering text in the field

- › If an input is required, you can type information into the relevant field.






The keyboard-window will open.



	Switch to numbers/special characters
	Shift key
	Switch to German mutated vowels ("umlauts")
	
	Delete
	Cancel input and close keyboard
	Confirm input and close keyboard
	Space bar

9.4 Calling up messages on the touch screen

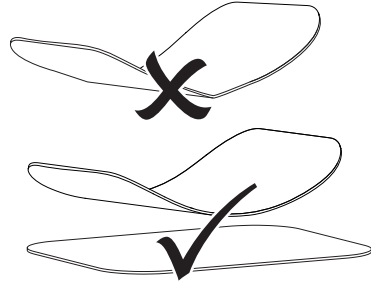
The *Messages* view shows an overview of all previous messages. Here, the messages are divided into the following categories:

	Fault	Unit will no longer function. When the error has been remedied, it may be necessary to acknowledge the error message.
	Notice	After acknowledgement the unit will continue to work, but only with limited functions.
	Note	Important information for the operator, e.g. about the current status of the device. The unit continues to operate.
	Information	Information for the operator. The unit continues to operate.
	Normal operation	

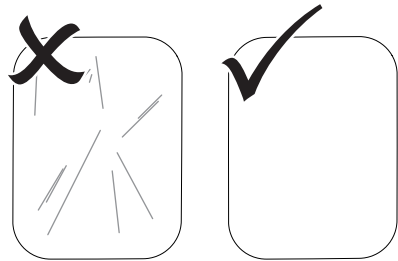
- › Tap on *Messages*.
The message is displayed. If there are several messages, the most current with the highest priority is displayed first.
- › For more information about the message, touch *Help*.

10 Correct use of image plates

- › Image plates are flexible like X-ray film. However, the image plates should not be bent.



- › Do not scratch the image plates. Do not subject the image plates to pressure from hard or pointed objects.



- › Do not soil the image plates.
- › Protect the image plates against sunlight and ultraviolet light. Store the image plates in a light protection cover of the correct size.
- › Image plates will be pre-exposed on exposure to natural radiation and stray x-ray radiation. Protect erased and exposed image plates from X-ray interference. If the image plate has been stored for longer than one week, erase the image plate prior to use.
- › Do not store image plates under hot or moist conditions. Observe the correct ambient conditions (see "4.2 Image plate").
- › When used properly, image plates can be exposed, read and erased several hundred times provided there is no mechanical damage. Replace the image plate if there are any signs of damage (e.g. protective layer is damaged or visible scratches) that could interfere with the diagnosis.

- › Clean image plates properly (see "12.2 Image plate").

11 Operation



CAUTION

The image data on the image plate is not permanent.

The image data is altered by light, natural X-ray radiation and scattered X-ray radiation. This will lead to a reduction in diagnostic information and clarity.

- › Read the image data within 30 minutes of exposure.
- › Never handle exposed image plates without the light protection cover.
- › Do not subject an exposed image plate to X-ray radiation before or after the scanning process. Do not X-ray during the scanning process if the unit is in the same room as the X-ray tube.
- › Image plates must only be read using an image plate scanner that is approved by DÜRR NDT.

11.1 X-ray



The procedure is described using an 18x24 image plate as an example.

Required accessories:

- Image plate
- CR 35 image plate cassette, plastic cassette or CR 35 flexible cassette/light protection cover matching the size of the image plate

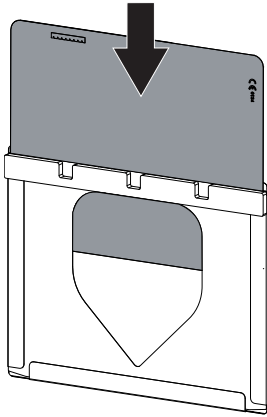
Preparing the X-ray

The image plate must be prepared differently according to actual operational conditions (humidity, cleanliness, mechanical loads).

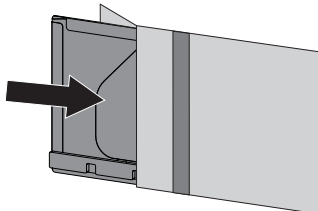
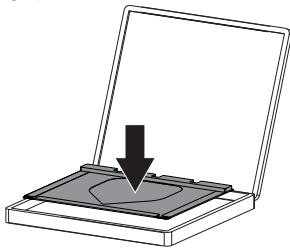
- ✓ The image plate has been cleaned.
- ✓ The image plate is not damaged.
- › If using it for the first time or if it has been stored for over a week: erase the image plate (see "11.4 Erasing the image plate").

X-ray with CR 35 image plate cassette

- › Slide the image plate completely into the CR 35 image plate cassette. The black (inactive) side of the image plate must be visible.



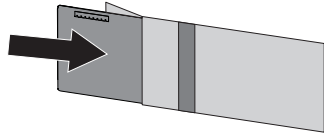
- › Place the CR 35 image plate cassette in the plastic cassette. The foam rubber side of the CR 35 image plate cassette must point in the direction of the cover of the X-ray cartridge. Alternatively, the CR 35 image plate cassette can be packed inside a CR 35 flexible cassette. The seal must be on the inactive side of the image plate.



- › Where required, the correct position of the image plate (left or right side) can be identified using lead letters.

X-ray without CR 35 image plate cassette

- › Slide the image plate directly into the CR 35 flexible cassette or the light protection cover. The seal must be on the inactive side of the image plate.



- › Close the CR 35 flexible cassette/light protection cover.
- › Where required, the correct position of the image plate (left or right side) can be identified using lead letters.

Taking the X-ray image

- › Insert the X-ray cartridge into the x-ray unit. Make sure that the active side of the image plate points towards the X-ray tube.
- › Set the exposure time and setting values on the X-ray unit.
- › Record an X-ray image.

Result:

The image data must be scanned within 30 minutes.

Preparing for scanning

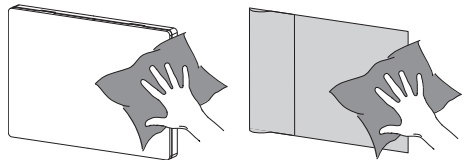


CAUTION

Light erases the image data on the image plate

- › Never handle exposed image plates without the CR 35 image plate cassette.

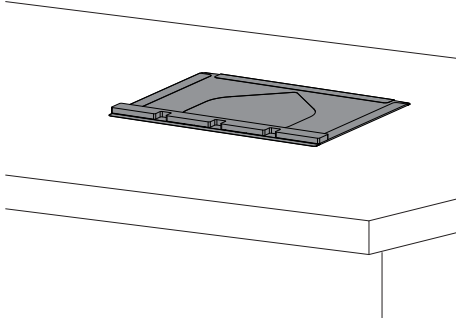
- › Remove the plastic cassette/CR 35 flexible cassette from the X-ray unit.
- › In the event of heavy soiling, e. g. from grease or oil, clean the plastic cassette/CR 35 flexible cassette, e. g. by wiping with a dry and clean cellulose cloth.





Where the image plate is used without the CR 35 image plate cassette, then it must not be removed from the CR 35 flexible cassette/light protection cover and placed aside.

- › Take the CR 35 image plate cassette with the image plate and place it on a working surface.



11.2 Scanning the image data via a computer

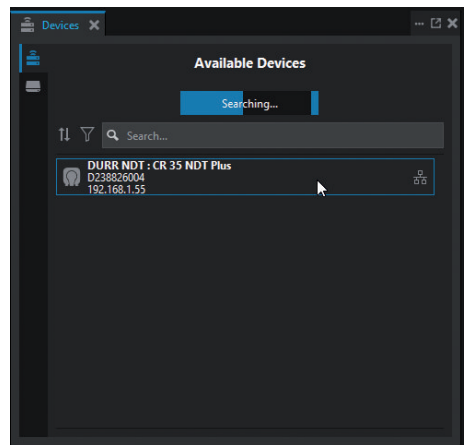
Starting the image plate scanner and software



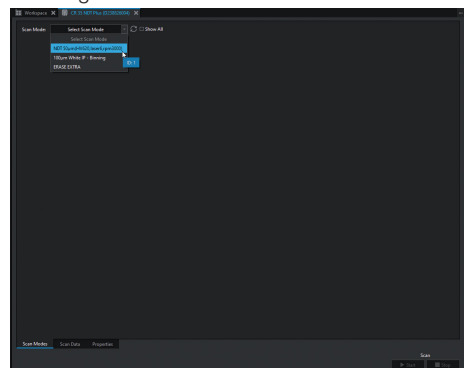
Scanning is executed using the D-Tect X imaging software.

For further information on using the imaging software, refer to the relevant manual.

- › Press the on / off switch ϕ to switch on the unit.
- › Switch on the computer and monitor.
- › Start the imaging software.
- › Select the *Units* tab.



- › Double-click on the unit in the selection list.
- › Change to the Units tab.



- › Select the scanning mode.

› Click **Start**.

The touch screen will display an animated visual symbol requesting insertion of the image plate.



Only insert the image plate when the bar above the animated sequence has turned to green.



Fig. 3: Example of the animation requesting insertion of the image plate

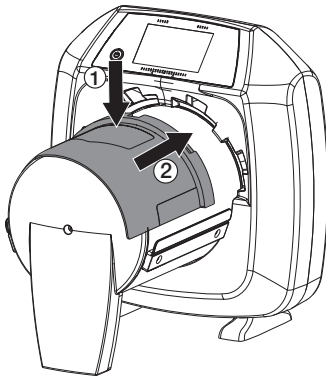


In order not to mix up X-ray exposures, only scan X-ray images from the selected project.

Scanning the image plate

X-ray with CR 35 image plate cassette

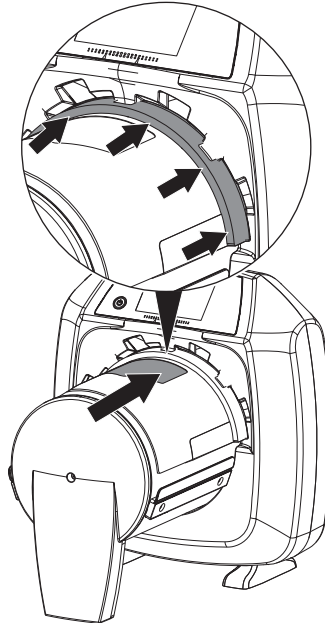
- › Remove the CR 35 image plate cassette from the X-ray cassette.
- › Place the CR 35 image plate cassette with the image plate in the entry slot of the transport drum\.



CAUTION

Loss of image data caused by light entering the device

- › Do not remove the CR 35 image plate cassette until the image plate has passed completely through the unit.
- › Slide the image plate into the device with both hands until it is automatically taken up by the transport.



Scanning progress is displayed on the touch screen. The image data is saved automatically.



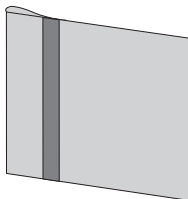
The touch screen only shows a preview, which provides an initial impression of the X-ray image. Limitations to image previews occur due to image size and/or exposure conditions. For purposes of diagnosis the X-ray image must be viewed on a diagnostic monitor.

After scanning the image plate data is erased.

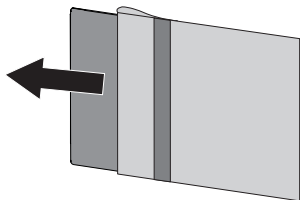
- › Save the X-ray image.
- › Remove the image plate and prepare it for taking a new X-ray.
- › Remove the CR 35 image plate cassette.

X-ray without CR 35 image plate cassette

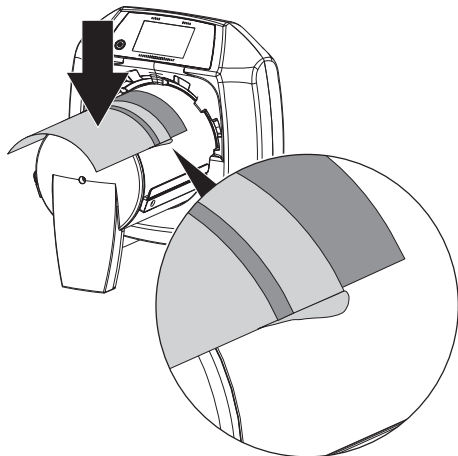
- › Open the CR 35 flexible cassette/light protection cover.
- › Fold the flap to the back.



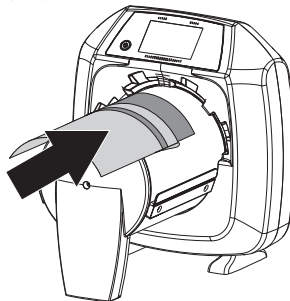
- › Remove a small section of the image plate from the CR 35 flexible cassette/light protection cover



- › Place the CR 35 flexible cassette/light protection cover in the entry slot of the transport drum.



- › Place the CR 35 flexible cassette/light protection cover together with the image plate into the unit until the image plate is automatically taken up by the unit.



Scanning progress is displayed on the touch screen. The image data is saved automatically.



The touch screen only shows a preview, which provides an initial impression of the X-ray image. Limitations to image previews occur due to image size and/or exposure conditions. For purposes of diagnosis the X-ray image must be viewed on a diagnostic monitor.

After scanning the image plate data is erased.

- › Save the X-ray image.
- › Remove the image plate and prepare it for taking a new X-ray.
- › Open the CR 35 flexible cassette/light protection cover.

11.3 Scanning image data via the touch screen on the unit

Starting the image plate scanner

When scanning the image data via the touch screen, there is no need for a PC connection. The image data is stored locally on the memory card. In order to transfer the image data to the imaging software, the unit must be connected to a computer.

Scanning via the touch screen can be done in two ways:



Scanning:

Before scanning the image data, the project data and exposure settings of the image are entered and then saved with the image data.

When no project data and exposure settings of the image are entered then the image is saved to a folder with date and time.



Rapid scanning:

The image data is saved to a folder with the date and time and no additional information.



Use **Help** on the touch screen for further information on operating the unit via the touch screen.

Requirements:

- ✓ Memory card (SDHC, max. 32 GB) in the slot on the unit.
- › Press \odot to switch on the unit.

Start scanning:

- › On the touch screen tap **Scan**.
- › Enter project data.

- › Select image settings and scan mode (see "4.3 Scanning modes").
The touch screen will display an animated visual symbol requesting insertion of the image plate.



Only insert the image plate when the bar above the animated sequence has turned to green.



Fig. 4: Example of the animation requesting insertion of the image plate

Start rapid scanning:

- › On the touch screen tap on **Rapid scan**.
- › Select the scanning mode.
The touch screen will display an animated visual symbol requesting insertion of the image plate.



Only insert the image plate when the bar above the animated sequence has turned to green.

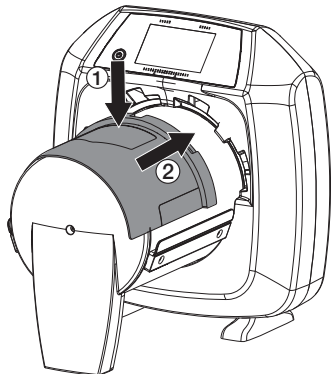


Fig. 5: Example of the animation requesting insertion of the image plate

Scanning the image plate

X-ray with CR 35 image plate cassette

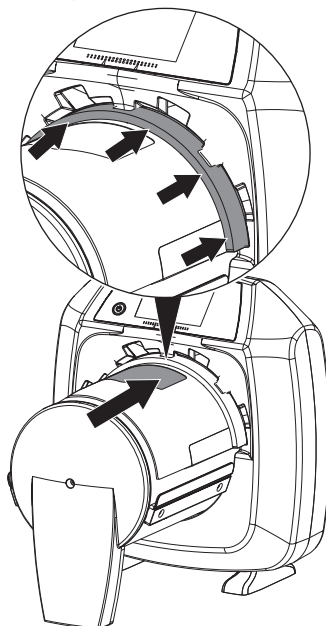
- › Remove the CR 35 image plate cassette from the X-ray cassette.
- › Place the CR 35 image plate cassette with the image plate in the entry slot of the transport drum).



CAUTION

Loss of image data caused by light entering the device

- › Do not remove the CR 35 image plate cassette until the image plate has passed completely through the unit.
- › Slide the image plate into the device with both hands until it is automatically taken up by the transport.



Scanning progress is displayed on the touch screen. The image data is saved automatically.



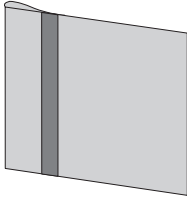
The touch screen only shows a preview, which provides an initial impression of the X-ray image. Limitations to image previews occur due to image size and/or exposure conditions. For purposes of diagnosis the X-ray image must be viewed on a diagnostic monitor.

After scanning the image plate data is erased.

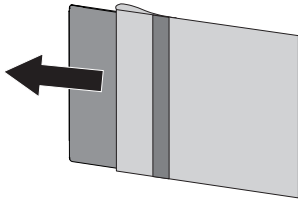
- › Save the X-ray image.
- › Remove the image plate and prepare it for taking a new X-ray.
- › Remove the CR 35 image plate cassette.

X-ray without CR 35 image plate cassette

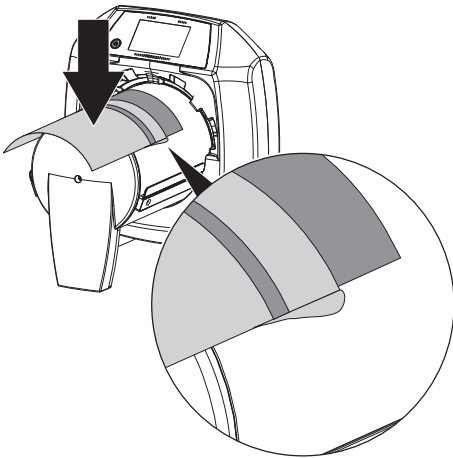
- › Open the CR 35 flexible cassette/light protection cover.
- › Fold the flap to the back.



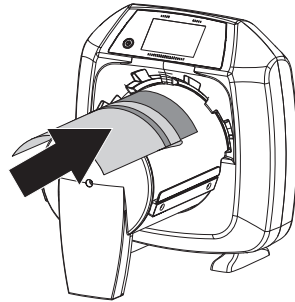
- › Remove a small section of the image plate from the CR 35 flexible cassette/light protection cover



- › Place the CR 35 flexible cassette/light protection cover in the entry slot of the transport drum.



- › Place the CR 35 flexible cassette/light protection cover together with the image plate into the unit until the image plate is automatically taken up by the unit.



Scanning progress is displayed on the touch screen. The image data is saved automatically.



The touch screen only shows a preview, which provides an initial impression of the X-ray image. Limitations to image previews occur due to image size and/or exposure conditions. For purposes of diagnosis the X-ray image must be viewed on a diagnostic monitor.

After scanning the image plate data is erased.

- › Save the X-ray image.
- › Remove the image plate and prepare it for taking a new X-ray.
- › Open the CR 35 flexible cassette/light protection cover.

Transmitting image data to the computer

X-ray images created using the touch screen of the device are saved to a memory card. These X-ray images can be imported via a network connection to the imaging software (e.g. D-Tect).

- › Connect the unit to the network.
- › Start the imaging software.
- › Start the image import via the imaging software (further information can be found in the manual of the imaging software).
- › Save the image data.

The image data on the memory card is erased automatically as soon as the transfer has been successfully completed.

11.4 Erasing the image plate

The image data is automatically erased after scanning.

If you do not want the image data to be erased, this function can be disabled for the current scanning process by selecting *Disable erasing light* on the touch screen of the unit.

The special *ERASE* mode only activates the erasure unit of the image plate scanner. No image data is read.

The image plate needs to be erased using the special mode in the following cases:

- The first time the image plate is used, or if it is stored for longer than a week.
- Due to an error, the image data on the image plate has not been erased (software error message).


Erasing the image plate via a computer

- › Select the special *ERASE* mode in the software.
- › Scan the image plate (see "11.2 Scanning the image data via a computer").

Erasing the image plate via the touch screen

- › On the touch screen tap on *Rapid scan*.
- › Select the scanning mode *ERASE*.
- › Scan the image plate (see "11.3 Scanning image data via the touch screen on the unit").

11.5 Switch off the unit.

- › Press the on/off switch  for 3 seconds. As soon as the unit has shut down it switches off completely. The touch screen is off.



After you switch off the unit, wait 10 s before switching the unit on again.

12 Cleaning



NOTICE

The use of unsuitable agents and methods can damage the unit and accessories.

Do not use any products based on phenolic compounds, halogen-releasing compounds, strong organic acids or oxygen-releasing compounds, as they may damage the materials.

- › DÜRR NDT recommends that any soiling be removed with a soft, lint-free cloth that has been dampened with cold tap water.
- › For cleaning, DÜRR NDT recommends using 70% 2-propanol (isopropyl alcohol) on a soft, lint-free cloth.
- › Observe the cleaning agent instructions for use.

12.1 Image plate scanner

Unit surfaces



NOTICE

Liquid can cause damage to the unit.

- › Do not spray cleaning agent on the unit.
- › Make sure that liquid does not get inside the unit.

- › Remove any soiling with a soft, damp, lint-free cloth.
- › Existing dirt on the feed and output area must be removed before scanning.

12.2 Image plate

Use the following cleaning agents:

- ✓ IP Image Plate Cleaning Wipe



NOTICE

Heat or humidity will damage the image plate

- › Observe the ambient conditions during operation.
- › Only use approved cleaning agents.

- › Soiling on both sides of the image plate should be cleaned off with a soft, lint-free wipe prior to every use.

- › Remove resistant or dried on dirt with the image plate cleaning wipe. When doing this, follow the instructions for use for the cleaning wipe.
- › Allow the image plate to completely dry before using it.

12.3 Image plate cassette, flexible cassette, plastic cassette

When dirty, the surfaces must be cleaned.

- › Remove any soiling with a soft, lint-free cloth that has been dampened with cold tap water.
- › To clean, use 70 % 2-propanol (isopropyl alcohol) on a soft, lint-free cloth.
- › Allow to completely dry before use.

12.4 Stylus

The stylus can be cleaned in the same way as the unit (see "12.1 Image plate scanner").

13 Maintenance

13.1 Recommended maintenance schedule



Only specialist staff or personnel trained by DÜRR NDT may maintain the appliance.




Prior to working on the unit or in case of danger, disconnect it from the mains.


The recommended maintenance intervals are based on operating the appliance 220 working days per year.

Maintenance interval	Maintenance work
Annually	› Visually inspect the device.
	› Check the image plates and cassettes for scratches, and replace if necessary.
	› Check the light protection brush; trim and remove long hairs or replace the light protection brush if necessary. The oscilloscope must not exceed 600 counts.
	› Check the belt drives, transport belts and springs, and replace if necessary.
	› Disassemble the transport drum.
	› Remove dust and dirt from accessible parts.
	› Mount the transport drum.
Every 2 years	› Carry out a system check. Set up report files using CRConfig.
	› Replace the pressure roller unit.
	› Replace the transport belts and tension springs.
	› Replace the toothed belt.
	› Check the light protection brush; trim and remove long hairs or replace the light protection brush if necessary. The oscilloscope must not exceed 600 counts.
Every 5 years	› Disassemble the transport drum and clean. Remove hair and fluff.
	› Arrange general overhaul by Dürr NDT.

? Troubleshooting

14 Tips for operators and service technicians

 Any repairs exceeding routine maintenance may only be carried out by qualified personnel or our service.

 Prior to working on the unit or in case of danger, disconnect it from the mains.

14.1 Poor X-ray image

Error	Possible cause	Remedy
X-ray image does not appear on the monitor after scanning	Image plate inserted the wrong way round, inactive side was scanned	› Scan the image plate again immediately, making sure you feed it in correctly in the process.
	Image data on the image plate has been erased, e.g. by ambient light	› Always scan the image data of the image plate as quickly as possible.
	Fault on the unit	› Inform a Service Technician.
	No image data on image plate, image plate not exposed	› Expose the image plate.
	X-ray unit is faulty	› Inform a Service Technician.
X-ray image too dark	X-ray dose too high	› Check X-ray parameters.
	Incorrect brightness/contrast settings in the software	› Adjust the brightness of the X-ray image in the software.
X-ray image too bright	Exposed image plate has been exposed to ambient light	› Always scan the image data of the image plate as quickly as possible.
	X-ray dose too low	› Check X-ray parameters.
	Incorrect brightness/contrast settings in the software	› Adjust the brightness of the X-ray image in the software.
X-ray image only shadowy	The X-ray dose on the image plate was insufficient	› Increase X-ray dose.
	Amplification (HV value) is set too low in the software	› Increase amplification (HV value).
	Unsuitable scanning mode selected	› Select a suitable scanning mode.
	The setting for the threshold value is too high	› Reduce the threshold value.
Top or bottom bulge in the X-ray image	Image plate fed in off-centre and at an angle	› Insert the image plate centrally and straight.

Error	Possible cause	Remedy
X-ray image is mirror-inverted	Image plate not inserted straight in foil cassette or light protection cover.	› Insert image plate correctly.
	Image plate not placed straight.	› Position the image plate correctly.
Ghosting or double exposure on X-ray image	Image plate exposed twice	› Only expose the image plate once.
	Image plate not sufficiently erased	› Check the erasure unit is working correctly. › Inform a service technician if the problem persists.
X-ray image mirrored in one corner	Image plate bent during X-ray exposure	› Do not bend the image plate.
Shadow on the X-ray image	Image plate removed from the light protection cover before scanning	› Do not handle image plates without a light protection cover. › Store the image plate in a light protection cover.
	The metal part of the X-ray tube is in front of the X-ray beam	› When taking an X-ray, make sure there are no metal parts between the X-ray tube and the patient. › Check X-ray tube.
X-ray image cut off, part missing	Faulty edge masking in imaging software	› Deactivate edge masking.
	The X-ray dose on the image plate was insufficient	› Increase X-ray dose.
Software unable to combine the data to make a complete image	Amplification (HV value) is set too low in the software	› Increase amplification (HV value).
	Unsuitable scanning mode selected	› Select a suitable scanning mode.
	The setting for the threshold value is too high	› Reduce the threshold value.
X-ray image has strips on image	Image plate has been pre-exposed, e.g. by natural radiation or stray X-ray radiation	› If the image plate has been stored for longer than one week, erase the image plate prior to use.
	Parts of image plate exposed to light during handling	› Do not expose used image plates to bright light. › Scan image data within half an hour after the exposure.
	Image plate dirty or scratched	› Clean the image plate. › Replace scratched image plates.

Error	Possible cause	Remedy
Light strips in the scanning window	Too much incident ambient light during the scanning process	<ul style="list-style-type: none"> › Darken the room. › Turn the unit so that the light does not fall directly onto the input unit.
Horizontal, grey lines on the X-ray image, extending beyond the left and right image edge	Transport slipping	<ul style="list-style-type: none"> › Clean the transport mechanism, replace the transport belts if necessary.
X-ray image is stretched lengthwise with bright, horizontal stripes	Incorrect light protection cover or image plate used	<ul style="list-style-type: none"> › Only use original accessories.
X-ray image split vertically into two halves	Dirt in the laser slit (e.g. hair, dust)	<ul style="list-style-type: none"> › Clean the laser slit.
X-ray image with small bright spots or clouding	Micro scratches on the image plate	<ul style="list-style-type: none"> › Replace the image plate.
Lamination of the image plate becoming detached at the edge	Incorrect retainer system used	<ul style="list-style-type: none"> › Only use original image plates and film retainer systems.
	Image plate handled incorrectly.	<ul style="list-style-type: none"> › Use the image plate correctly. › Observe the operating instructions for the image plates and film retainer systems.
X-ray resolution does not correspond to values set/selected	Focus adjustment defect (lacks setting noise)	<ul style="list-style-type: none"> › Inform a Service Technician.

14.2 Software error

Error	Possible cause	Remedy
"Too much ambient light"	Unit exposed to too much light	<ul style="list-style-type: none"> › Darken the room. › Turn the unit so that no light can fall directly into the entry slot.
"Overtemperature"	Laser or erasure unit too hot	<ul style="list-style-type: none"> › Switch off the unit and allow it to cool.
"Erasure unit fault"	LED defective	<ul style="list-style-type: none"> › Inform a Service Technician.

Error	Possible cause	Remedy
Imaging software does not recognise the unit	Unit not switched on	<ul style="list-style-type: none"> › Switch on the unit.
	Connecting cable between device and computer not correctly connected	<ul style="list-style-type: none"> › Check the connecting cable.
	Computer does not detect any connection to the unit.	<ul style="list-style-type: none"> › Check the connecting cable. › Check the network settings (IP address and subnet mask).
	Hardware fault	<ul style="list-style-type: none"> › Inform a Service Technician.
	The IP address of the device is being used by another unit	<ul style="list-style-type: none"> › Check the network settings (IP address and subnet mask) and assign a unique IP address to every device. › Inform a service technician if the problem persists.
Unit does not appear in the selection list in CRScanConfig	Unit is connected behind a router	<ul style="list-style-type: none"> › Configure the IP address without an intermediate router on the unit. › Reconnect the router. › Manually enter the IP address in CRScanConfig and register the unit.
	The IP address of the device is being used by another unit	<ul style="list-style-type: none"> › Check the network settings (IP address and subnet mask) and assign a unique IP address to every device. › Inform a service technician if the problem persists.
Unit appears in the selection list in CRScanConfig, but connection is not possible	Subnet masks of the computer and the unit do not match	<ul style="list-style-type: none"> › Check subnet masks, adjust if necessary.
Error message "E2490"	The connection to the unit was interrupted while the software was still attempting to communicate with the unit	<ul style="list-style-type: none"> › Restore the connection to the unit. › Repeat the process.
Error during data transmission between unit and computer. Error message "CRC error timeout"	Connecting cable used is incorrect or too long	<ul style="list-style-type: none"> › Only use original cables.

14.3 Fault on the unit

Error	Possible cause	Remedy
Unit does not switch on	No mains voltage	<ul style="list-style-type: none"> › Check the mains cable and plug connection and replace if necessary. › Check the power supply unit. › If the touch screen does not light up, replace the power supply. › Check the mains fuse in the building.
	On / off switch is defective	› Inform a Service Technician.
	Unit switches back off after a short time	Mains cable or power supply unit plug not inserted correctly
Hardware fault		› Inform a Service Technician.
Mains supply voltage too low		› Check the mains voltage.
Loud operating noises after switching on lasting more than 30 seconds	Radiation deflector defective	› Inform a Service Technician.
Unit not responding	The unit has not yet completed the startup procedure	› After switching on, wait 20 - 30 seconds until the startup procedure has finished.
	Unit is blocked by the firewall	› Enable the ports for the unit in the firewall settings.
Unit is on, but there is no display on the touch screen	Touch screen initialisation fault	› Switch the unit off and back on again.
	Touch screen brightness set too dark	<ul style="list-style-type: none"> › Update the firmware. › Increase the brightness of the touch screen.
	Touch screen defective	› Inform a Service Technician.

Error	Possible cause	Remedy
Network connection has been disconnected	WLAN stick not inserted	› Insert the WLAN stick into the unit.
	Distance to WLAN router too great	› Set up the unit closer to the WLAN router.
	Walls between WLAN router and unit too thick	› Set up the unit closer to the WLAN router.
	Another WLAN network is affecting the operation of the unit's WLAN network	› Change the frequency range of the WLAN network.
	Connecting cable between device and computer not correctly connected	› Check the connection cable.
	The IP address of the device is being used by another unit	› Check the network settings (IP address and subnet mask) and assign a unique IP address to every device. › Inform a service technician if the problem persists.

14.4 Error messages on the touch screen

Error	Possible cause	Remedy
Error code -1008	Internal connection interrupted	› Update the firmware.
Error code 1010	Temperature of unit too high	› Allow the unit to cool down. › Inform a Service Technician.
Error code 1022	Subassembly not initialised	› Fault in software, update the software if required. › Inform a Service Technician.
Error code 1024	Internal data communication fault	› Switch the unit off and back on again. › Update the firmware. › Darken the room. › Turn the unit so that no light can fall directly into the entry slot.
Error code 1026	Incorrect acquisition mode	› Select a different acquisition mode › Inform a Service Technician. › Update the firmware. › Reset the scanning modes to the factory settings via the unit interface or the Imaging Software.
Error code 1100	Permitted time for scan process exceeded	› Inform a Service Technician. › Check the belt drive. › Check for blockage, remove image plate from unit.
Error code 1104	Erasure unit fault	› Inform a Service Technician. › Replace the erasure unit.
Error code 1153	Unit fault	› Switch the unit off and back on again. › Update the firmware.
Error code 1154	Internal data communication fault	› Switch the unit off and back on again. › Update the firmware.
Error code 1160	Final radiation deflector rotation speed not attained	› Inform a Service Technician. › Update the firmware. › Replace the radiation deflector subassembly if the problem occurs regularly.
Error code 1170	SOL sensor timeout Fault on the laser, SOL sensor or radiation deflector assembly	› Inform a Service Technician. › Update the firmware.

Error	Possible cause	Remedy
Error code 1172	Radiation deflector assembly or the SOL sensor defect	<ul style="list-style-type: none"> › Switch the device off and on. › Inform a Service Technician. › Replace the radiation deflector assembly.
Error code 10000	Unit exposed to too much light	<ul style="list-style-type: none"> › Darken the room. › Turn the unit so that no light can fall directly into the entry slot.
Error code 10009	Internal communication error warning; unit remains ready for operation	<ul style="list-style-type: none"> › Update the firmware.
Error code 10017	Unit shutting down	<ul style="list-style-type: none"> › Wait until the unit has shut down completely.
Error code 2	System error during startup of the unit	<ul style="list-style-type: none"> › Switch the unit off and back on again. › Update the firmware.
Error code -78	Storage medium (e. g. memory card or memory stick) is full	<ul style="list-style-type: none"> › Transfer the image data to the computer. › Insert empty storage medium.
	Fault during memory cleanup	<ul style="list-style-type: none"> › Press and hold the reset button while switching on the unit. › Update the firmware. › Press and hold the reset button while switching on the unit.
Firmware not running	A firmware update has been carried out.	<ul style="list-style-type: none"> › Switch the unit off and back on again.
	Internal communication fault	<ul style="list-style-type: none"> › Switch the unit off and back on again.
Settings (e.g. language) reset after unit restart	Faulty configuration file	<ul style="list-style-type: none"> › Update the firmware. › Reset the configuration to the factory settings and reconfigure.
Warning message during shutdown of the unit	Not a malfunction	<ul style="list-style-type: none"> › Update the firmware.

Appendix

15 Settings menu layout

Device information ¹	Device data
	Dealer information
	Report
Access level ¹	Operator
	Administrator
	Service Technician
	In-house technician

System settings ²	Language	German (DE)	
		English (EN)	
	Date & time	Date	
		Time	
	Network	MAC address	
		Name	
		Interface	LAN WLAN
		DHCP	
		IP address	
		Subnet mask	
		Gateway	
		Acquisition settings	Project number
	Genus project		
	Subtitle		
	Test date		
Comment			
X-ray parameters			
Acquisition type	Weld / solder seam		
	Casting / cast metal piece		
Touch screen	Brightness		
	Touch screen calibration		
Device settings	Standby		
	Stand-by time		
	Fade-out time menu		
	Patient ID scheme		
	Dimming		
	Service information		
	Service interval		
Operation mode	ScanManager		
	Exhibition mode		
Access protection	Admin. password		
	Service technician password		

Service menu ³	Test		
	Scanning mode	Display scanning modes	
		Edit scanning modes	
	Maintenance	Reset maintenance interval	
	Messages		
	Diagnosis	Statistics	
		Manipulation	Transport
			Insert
			Erasure unit
			Pentaprism
			PMT
		Query sensor values	Sensors
			Temperatures
			Internal device voltages
		Oscilloscope	
Check touch screen			
Display test images			
Factory settings	Reset scanning modes		

- 1 Visible from access level **Operator** or higher
- 2 Visible from access level **Administrator** or higher
- 3 Visible from access level **Service Technician** or higher

16 Scanning times

The scanning time corresponds to the time taken for complete scanning of image data and depends on image plate format and pixel size.

The time to image will depend largely on the computer system used and its work load. Times stated are approximate.

Scan mode name	BAM Certified Mode (15/15/30)	25µm Blue IP / High Res White IP	50µm White IP
Pixel size (µm)	15	25	50
10 x 24 (landscape)	118 s	101 s	37 s
18 x 24	181 s	148 s	57 s
24 x 30	501 s*	212 s	75 s
35 x 43	860 s*	344 s	134 s

* only possible with D-Tect X.

17 File sizes (uncompressed)

The actual file size will depend on the image plate format and the pixel size. File sizes stated are approximate and have been rounded upwards.

Suitable compression methods can considerably reduce the file size without loss of data.

Scan mode name	BAM Certified Mode (15/15/30)	25µm Blue IP / High Res White IP	50µm White IP
Pixel size (µm)	15	25	50
10 x 24	203 MB	73 MB	18 MB
18 x 24	366 MB	132 MB	33 MB
24 x 30	610 MB*	219 MB	55 MB
35 x 43	1.27 GB*	459 MB	115 MB

* only possible with D-Tect X.



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