



PRIMO S
Release 1.8.0.0

USER Manual
Revision B

Issued on 29/05/2020
Revised on 29/07/2022

PRIMO S is an application software for image acquisition and processing, in radiography mode using Flat Panel detectors.

PRIMO S could be installed on:

- *Complete Radiographic rooms,*
- *Portable Units,*
- *Mobile Units.*

Note: depending on the device, some features should not be present. Please refer to the following Manual for full details.

This X-ray device is produced by:



The equipment complies with European Directive 93/42 EEC and subsequent amendments, 2007/47 EEC.

The following harmonised standards apply to the EM equipment:

EN 62304 :	2006 + A1 : 2015
EN 62366-1 :	2015
EN 62563-1 :	2010
EN ISO 14971 :	2012
EN ISO 15223-1:	2016
EN 1041:	2008



Part 1 : GENERAL DESCRIPTION

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1 DESCRIPTION OF THE SOFTWARE

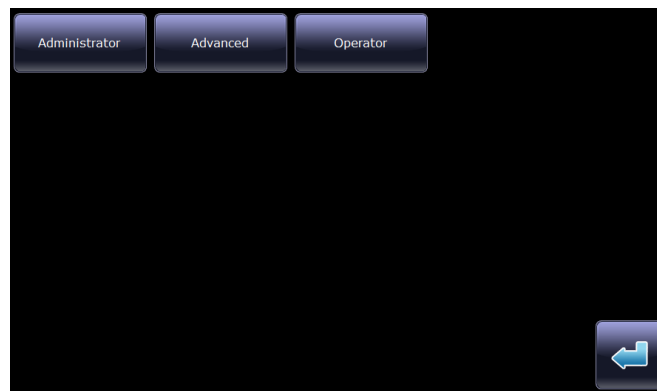
1.1 LOGIN

- After about one minute the equipment has been switched on, the *Login* page is displayed:



Attention: the use of the device must be reserved to persons who are competent, qualified, trained and informed about the risks when using X-rays.

- Fill in the User field or click  to view the Users list.



- Select a user, enter the password in the relevant field and finally **Log in** by pressing the Confirm button.

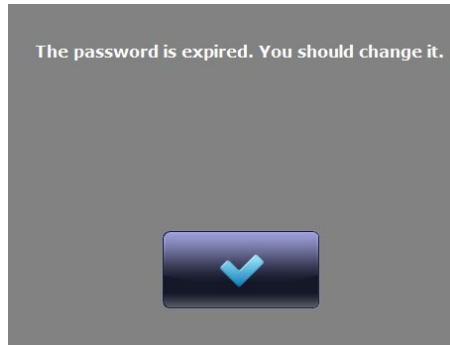
Note 1: The system allows to set, for each user, a permanent password or a password that lasts for 60 days. When necessary, the user will be advised to change his own password a few days before expiration (see next paragraph).

Note 2: if a wrong password is entered for 5 times consecutively, the user gets automatically blocked. See Paragraph 1.10.1 in Part 1 of the Technical Manual to restore the user's access.

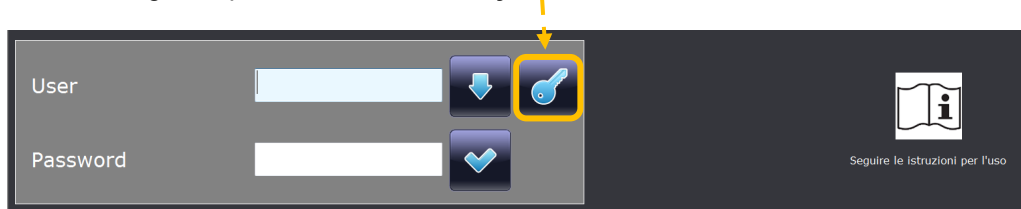
1.1.1 CHANGING A USER'S PASSWORD

Login passwords is normally valid for 60 days. After this time, the system asks the user to update his password every time he logs in.

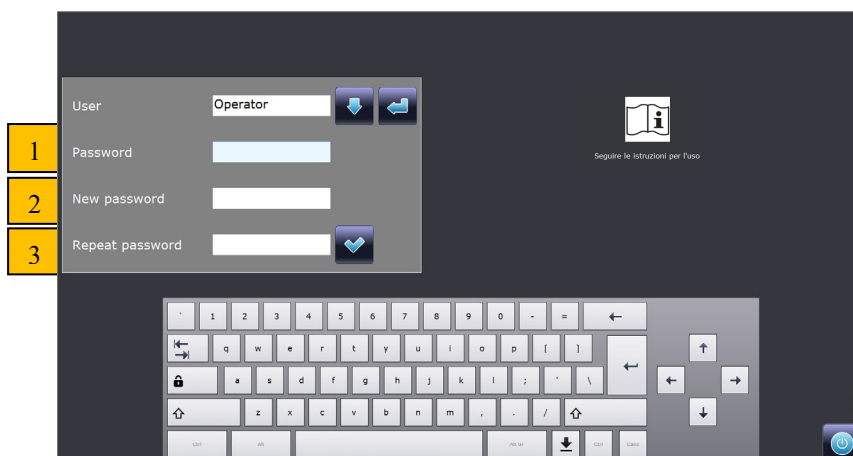
The following message appears during the Login:



- To change the password, click the **Key** icon:



- Now enter your old password (field #1) and the new one (field #2). Repeat the new password in the last field (field #3). Finally, confirm with the accept command:

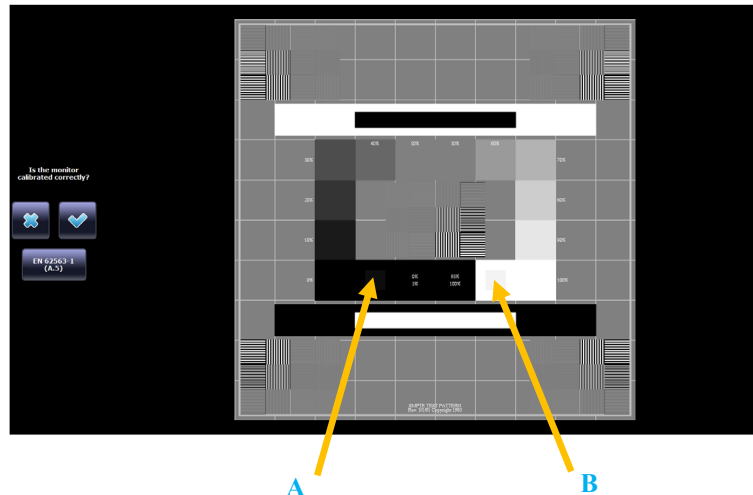


Note: The Administrator could change the password from the **User Setup**, too. See Paragraph 1.10 in Part 1 of the Technical Manual.

1.1.2 CHECKING THE MONITOR ADJUSTMENTS

To check the monitor correct calibration, a test pattern (SMPTE) is presented after a user logged in, to check the grey scale correct representation.

Check the monitor brightness and contrast by checking the appearance of the grey scale.



You need to check that the Test Pattern here is displayed correctly.

More specifically, it must be possible to see:

- the full grey scale (boxes from 0% to 100%),
- the grey square in the black box (0%),
- the grey square in the white box (100%).

If necessary, adjust the brightness and contrast values of the monitor, to make the entire grey scale visible.

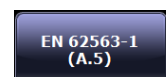
It is possible to check the correctness of calibration on other images, too.

Press **Accept** if the Test Pattern is displayed correctly: the **Create a new Patient** frame will be opened.



Note: For Administrator only, it is possible to check the correctness of calibration on other images, too.

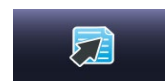
Press the button indicated and browse through the images with the relevant tips, checking the points above are satisfied.



- The **Patient Creation** frame:

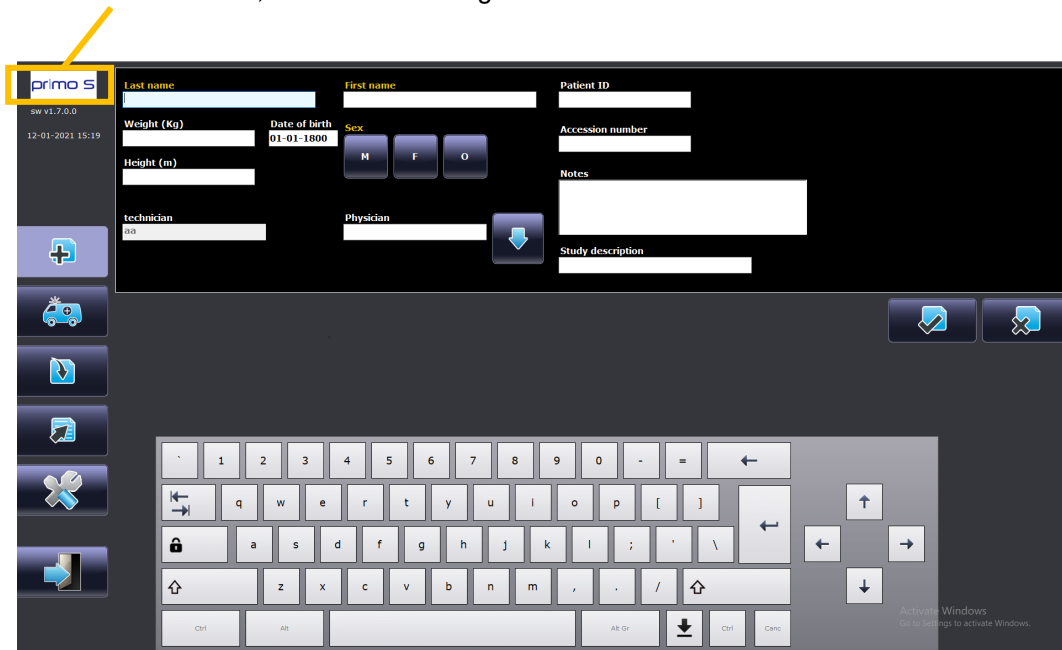
Now you can:

- Consult the Operator Manual before using the device.
- **Create a new Study:** fill in the required patient's data in the relevant fields.
- Enter the **Emergency** mode;
- Get the **Worklist**;
- Open the **Study list**;

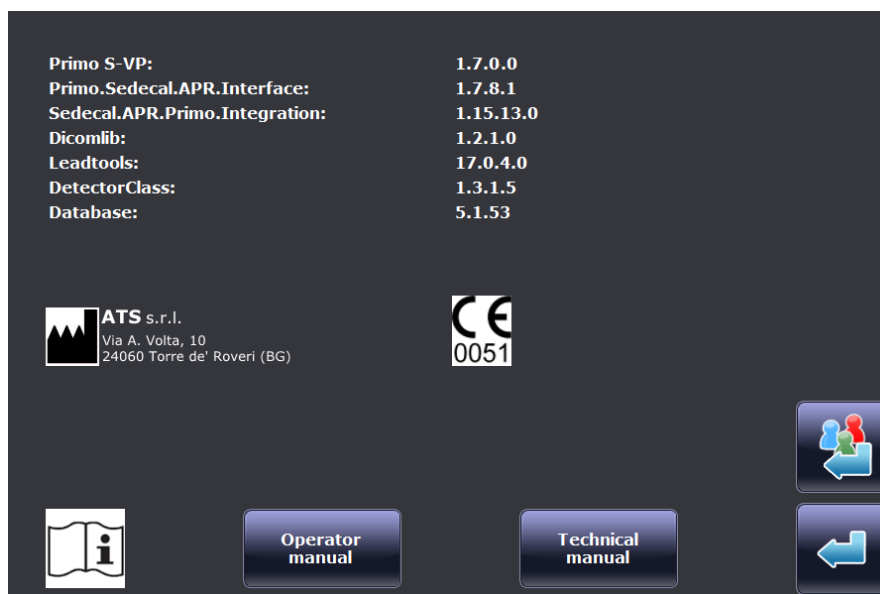


1.1.3 ONLINE MANUALS

Touch the **PRIMO S** icon, as shown in the figure below:



It opens a window and here you can:



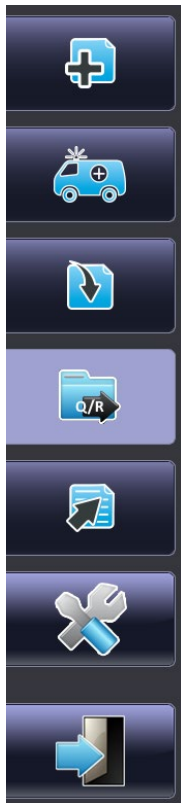
- 1) Get information about software versions and manufacturer.
- 2) Open the **User Manual** (PDF format).
- 3) Open the **Technical Manual** (PDF format).

Note: You can visualize the Technical Manual only if you enter the system as **Advanced** or **Administrator** user.

1.1.4 PATIENT CREATION FRAME

The **New Patient** frame:

Use the short-cut keys, on the left side, to:



- A. Manually create a new study (see Paragraph 1.2.5 below);
- B. Open the Emergency mode: you can skip directly in the working frame (without entering all the patient data), to place the exam faster. See Paragraph 1.1.5 below.
- C. Get the Worklist (optional). See Paragraph 1.2.6 below.
- D. Query / Retrieve function (optional). See Paragraph 3.3, Part 2 of the User Manual.
- E. Open the study list frame.
- F. Open System Setup (only for **Administrator** and **Advanced** users).
- G. Logout (return to login page);

1.1.5 EMERGENCY MODE



By pressing the relevant key, the **Emergency** mode Working frame is displayed.



In the image area appears the **Exam selection** window. Choose the needed anatomical region:

- *Head*
- *Chest*
- *Abdomen*
- *Spine*
- *Superior Extremity*
- *Inferior Extremity*.

For each anatomical region are available one or more exams, divided in anatomical part and view.

Once you selected the required exam (or exams), close the APR selection menu, pressing the relevant key.

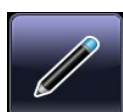


Default acquiring parameters (kV, mA, etc...) are automatically set.
Adjust them, if needed, and carry the exam out.

To **Add** another exam, press the relevant button.



Once you finish, press the **Suspend Study** key or the **Complete Study** one to close the working frame (see Paragraph 1.4, Part 2 of this Manual).

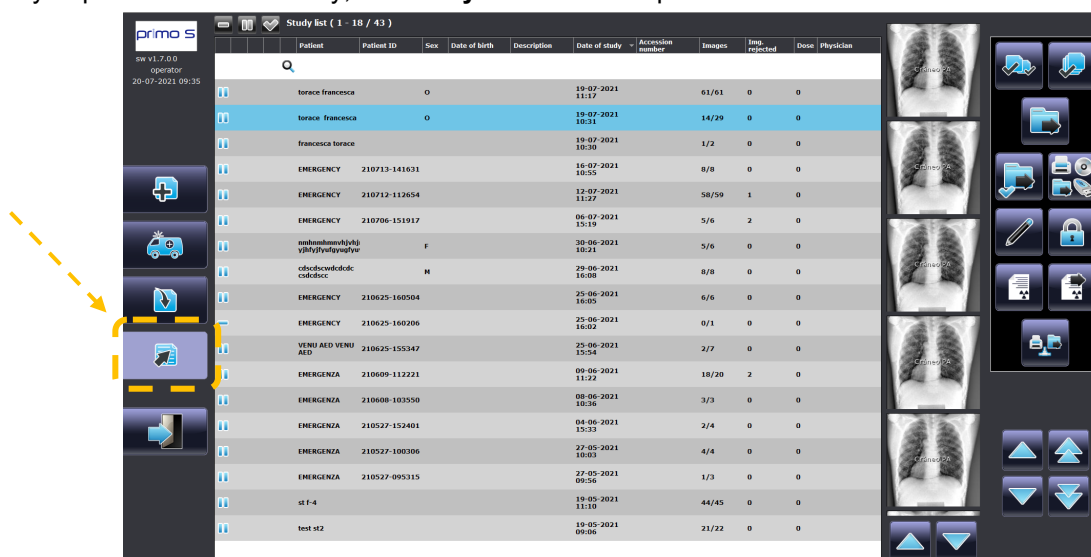


Edit button

To **Edit the Patient's Information**, choose the study and press the relevant button, enter the required data, and press the **Confirm** key to save.

1.2 STUDY LIST FRAME

If you press the relevant key, the **Study List** frame is opened.



The Study list, reports the following fields:

	Patient	Patient ID	Sex	Date of birth	Description	Date of study	Accession number	Images	Img. rejected	Dose	Physician
	EMERGENCY	180208-141230				08-02-2018 14:12		0/1	0	0	Operatrice
	EMERGENCY	180208-123923				08-02-2018 12:39		0/1	0	0	Operatrice

- The study status, which may be:
 - To Do: / Suspended: / Completed: / Protected:
 - Sent to DICOM store server: / Sent to DICOM printer:
- Icons related to the DICOM Storage Commitment (SC) function:
 - if the study awaiting STORE confirmation (from the SC server)
 - if at least one image in the study received STORE confirmation
 - if there has been a STORE error for at least one image in the study
 - if the RDSR report has been successfully sent.
- Patient (name and surname or surname and name, depending on settings: see Paragraph 1.6.1.1, Part 1 of the Technical Manual)
- Patient ID
- Sex
- Date of Birth
- Description
- Date of Study
- Accession Number
- Images
- Images rejected
- Dose
- Physician.

Note: the system is **not to be considered a patient data archive**. It is up to the hospital to provide a proper archive and storage for patient data.

You can enter data to filter the List, or you can sort it using the fields listed above (except Images, Images rejected and Dose).

Tap on a study once, to see its images in preview mode, aside the study list; tap twice to open the study.

- The **Working frame** is opened when you open a **To Do** study or a **Suspended** one which contains at least one exam to be performed (see paragraph 2.1 in this Manual).
- The **Image Processing frame** is opened when you select a **Completed** study or a **Suspended** one with no exam to be performed (see paragraph 3.1 in this Manual).

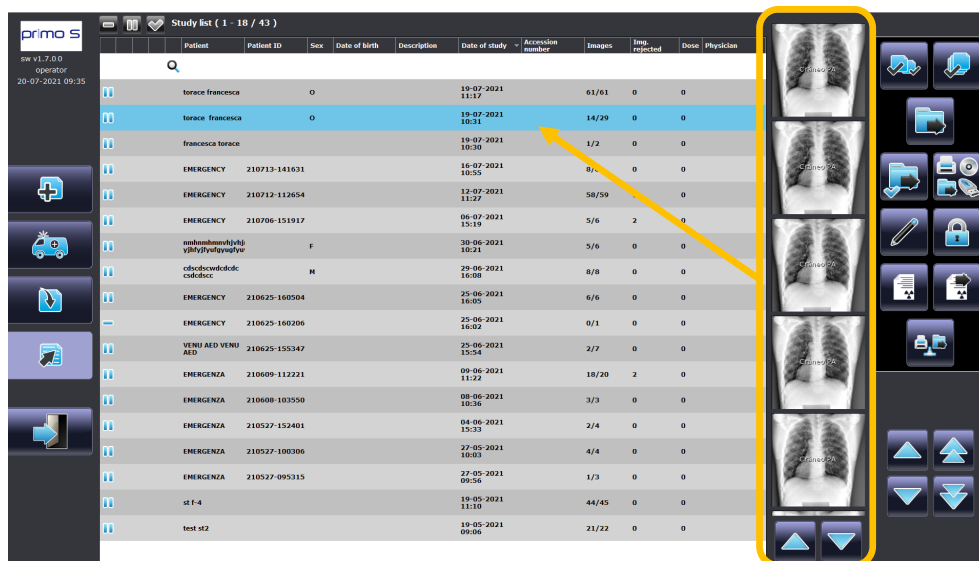
On the right-hand side of the study list frame, you find the following keys:



1. **Select Multiple studies:** to select more studies at the same time; (see Paragraph 1.2.4.1 below).
2. **Select All:** to select all studies in the page. (see Paragraph 1.2.4.1 below).
3. **Store:** send the selected study, or studies, to a DICOM store to be chosen (see Paragraph 3.1.1 in part 2 of this Manual).
4. **Export studies:** to export the selected study to a cd/dvd or to a USB memory device, only for **Advanced** and **Administrator** users (see Paragraph 3.2 in part 2 of this Manual).
5. **Default Store:** send the selected study, or studies, to the default DICOM store.
6. **Report tool:** to access the Report Tool Menu (see Paragraph 2.16 in part 2 of this Manual).
7. **Edit:** to edit study data.
8. **Delete studies:** to delete studies (only for **Administrator** user).
9. **Lock Study:** locked studies cannot be deleted (see Paragraph 1.2.4.3 below).
10. **RDSR:** It shows the dose report of the selected study.
11. **Send the RDSR:** to send the dose report of the selected study to the related DICOM node.
12. **Rejected images:** it shows the statistics about rejected images (only for **Administrator** and **Advanced** users).
13. **Spooler:** it shows the queue for DICOM store and print services (see Paragraph 3.1.3 in part 2 of this Manual).
14. **Up/Down arrow:** to scroll the study list upward or downward, study by study.
15. **Page Up/Down:** to go to the next/previous page in the list.

1.2.1 EXISTING STUDY

Select the study in the Study List by tapping on it: the study is highlighted and previews (thumbnails) of the images appear on the right.



- To change a study data, use the **Edit** command.



- Tap the study twice, or click on a thumbnail, to open the **Image Processing** frame:



- Now you can:

- Process the images using the commands on the right-hand side of the screen. (See chapter 3 in this part of the manual for further details).

- Open the Working frame to acquire new images, using this key:
(This is not possible if the study has already been completed: in this case the relevant button will not be shown).
- Complete (i.e. close) the current study by touching:



If the Study list contains a long list of studies, it is a good idea to use the search functions to easily find the required study. See next paragraph (1.2.2) for details.

Note 1: if you click on an empty thumbnail (the related image has not been acquired, yet), it will be opened the acquisition frame.

Note 2: in **General Setup** it is possible to set the **Automatic Deletion** of older studies. See Paragraph 1.5.1 in Part 1 of the Technical Manual.

1.2.2 SEARCH FUNCTIONS

The following functions help to use and manage the Study List:

1. **Sort list**
2. **Find study**
3. **Select study**
4. **Delete study (Administrator only)**

1.2.3 SORT THE LIST

The Study List can be sorted:

1. in chronological order (study date),
2. in alphabetical order by:
 - Patient name,
 - Patient ID,
 - Description,
 - Physician.

Touch the title of the parameter column you want to use, to sort the list. Touch the same column again to reverse the order (increasing/decreasing).

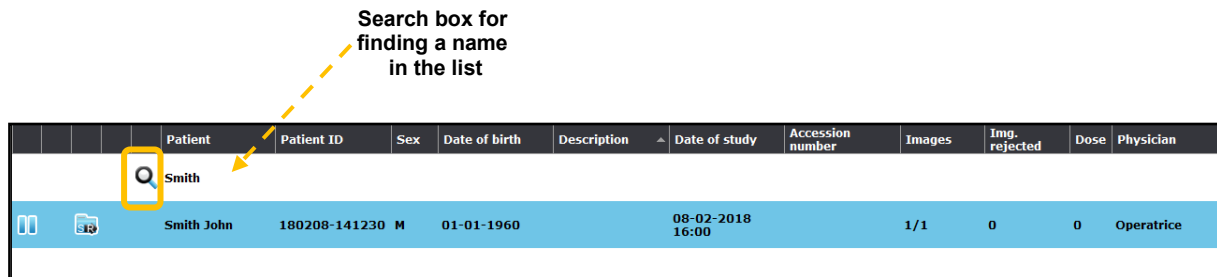
Sort by
Date of study

	Patient	Patient ID	Sex	Date of birth	Description	Date of study	Accession number	Images	Img. rejected	Dose	Physician
	Smith John	180208-141230	M	01-01-1960		08-02-2018 16:00		1/1	0	0	Operatrice
	EMERGENCY	180208-123923				08-02-2018 12:39		0/1	0	0	Operatrice

1.2.4 FIND A STUDY

You can filter the Study List, using the white field below a category name; enter the required data and only the corresponding study (or studies) will be shown.

You can use this search function for each category in the list (e.g. by "Patient"), except the **Image Rejected** one.

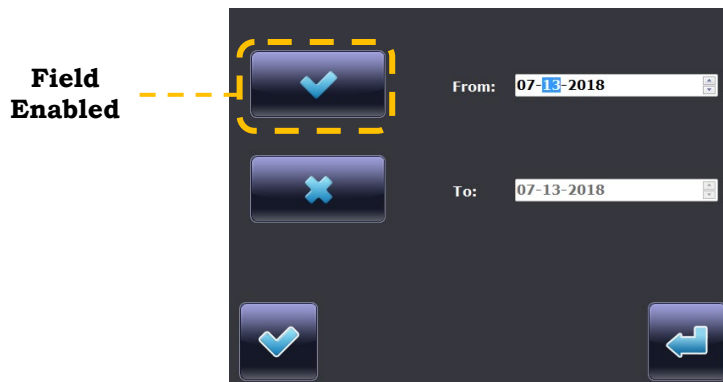


- Enter the data in the selected field and then press the **Search** key to start the search. Now, only the studies that meet your search criterium appear in the list.

In the figure above, it has been carried out a search by **Patient name**; only the studies where the patient's name is "**Smith**" are shown.

Note: to restore the complete list, delete the search filters and press the Search key, again.

Enter a date range to filter the list by **Date of study** (after the "From" and "To" fields have been enabled):



In **General Setup**, it is possible to set the number of days you want to see the studies of. (**View Last X days function**). Set "0" to view all the studies.

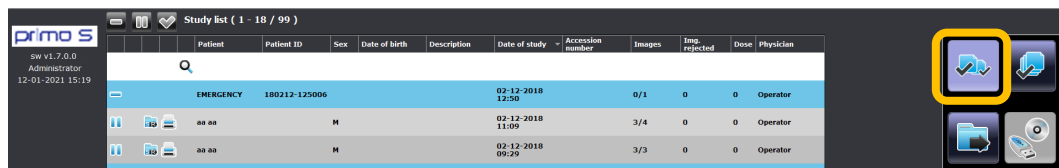
If the **View Last X days** function, in **General Setup**, is enabled (see paragraph 1.5.1 in Part 1 of the Technical manual), when you apply a different range of date, only the studies that fall into the new range will be shown.

This condition lasts until you are in the study list. After you exit this page, the **View Last X days** function will prevail.

1.2.4.1 SELECT STUDIES

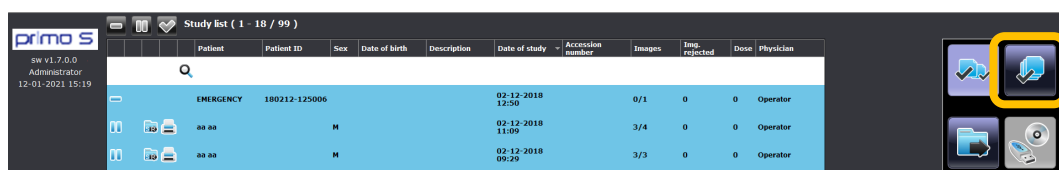
To select a single study, just tap on it and it will appear highlighted in blue.

Use the relevant command to select more studies (e.g. if you need to send them to a DICOM device):

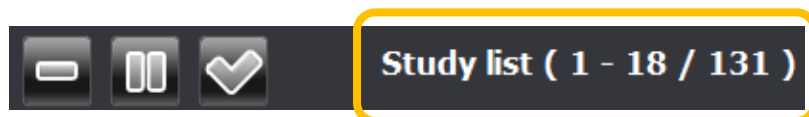


The selected studies are now highlighted in blue.

The relevant key makes you select all the studies present in the **current page** of the list.



They are shown **18 studies** per page; it means that only these studies will be selected.



Note: The icons with a grey background (respectively **Report tool**, **Edit patient information**, **RDSR** and **send the RDSR**) cannot be used when more than one study is selected.



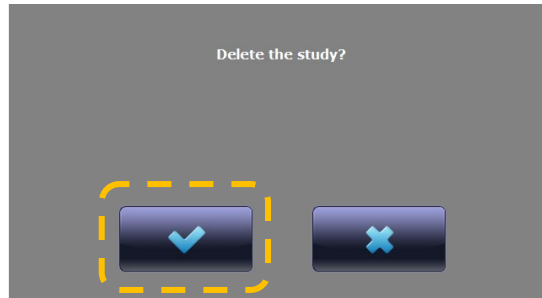
1.2.4.2 DELETE STUDIES

Note: Only the **Administrator** can delete studies or images.



Select in the Study List the study (or studies) to be deleted.
Now, press the relevant icon.

It is required to confirm the deletion:



Note: a deleted study cannot be restored.

1.2.4.3 PROTECT STUDIES FROM INCIDENTAL DELETION



To protect a study from unwanted deletion, it is possible to **Lock** a study, with the related key: a **locked study** is marked by a **grey lock pad**, in the Study List.

A locked study cannot be manually or automatically deleted, nor its images.

A locked study data cannot be modified.

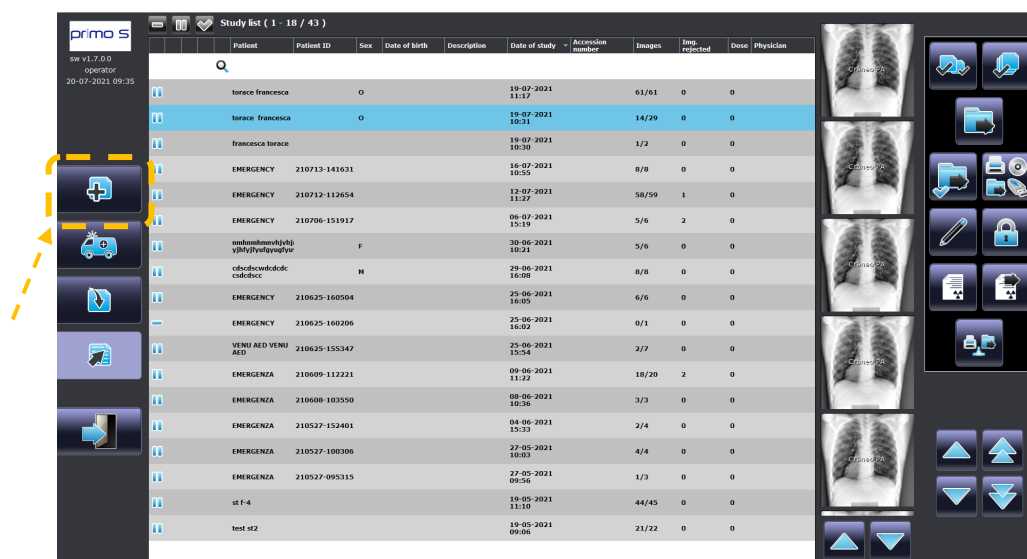
A locked study can be **unlocked only**:

- by the user who locked it,
- by the Administrator.

Note: it is possible also to lock single images within a study. Studies containing **locked images** are marked with a **light-blue lock pad**: see Paragraph 2.13 in Part 2 of this Manual.

1.2.5 CREATING A NEW STUDY

You can create a new study with the relevant command:



Enter the required data in **Patients' information** box:

- **Patient's Last Name** Patient's last name (max 30 characters).
- **Patient's First Name** Patient's first name (max 30 characters).
- **Patient ID** The patient code defined by the clinic management system. In **Emergency modality**, the system automatically create an ID based on date and time of the study creation.
- **Weight** Patient's weight (in kg).
- **Height** Patient's height (in m).
- **Date of birth** dd-mm-yyyy or mm-dd-yyyy, depending on the language set.
- **Sex** Male – Female - Unknown – Other
- **Accession Number** The access code defined by the clinic management system.

- **Technician** Who carries out the exam. With the drop-down menu, you can select between the enabled users list; otherwise, enter the name manually.
- **Physician** Who carries out the medical report. With the drop-down menu, you can select between the enabled users list; otherwise, enter the name manually.
- **Notes** Any note that could be useful to accomplish the study.
- **Study Description** A short note to describe the study.

Note: Patient's Last and First name, and Sex are always mandatory. From the setup menu, you can set the other fields as mandatory, or leave it discretionary; the name of a mandatory field is coloured in yellow.

Now:

- Press **Cancel** to close this window, without saving any data;

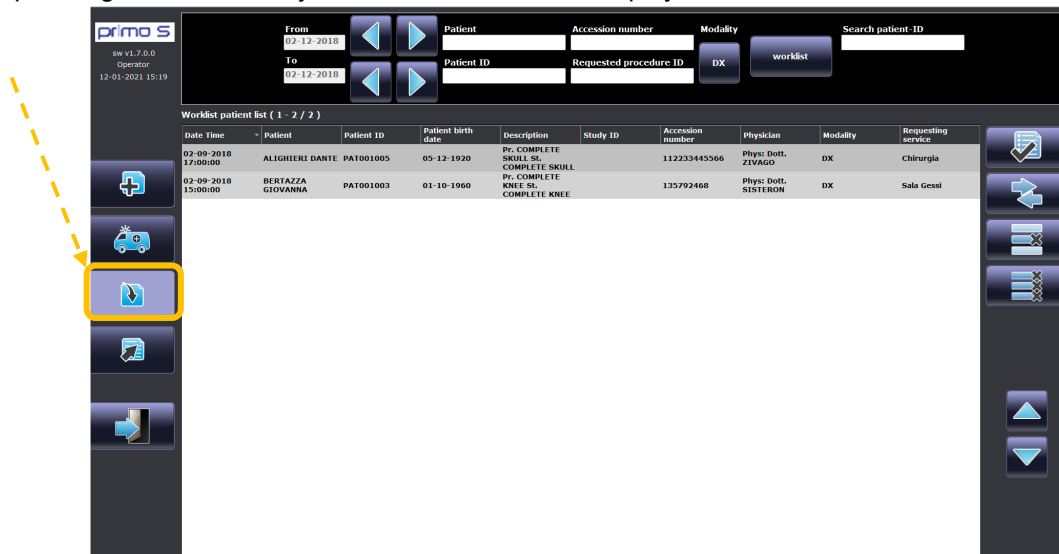


- Press **Apply** to save the new study and the **Working frame** will open.



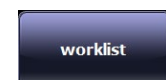
1.3 WORKLIST FRAME

By pressing the relevant key, the **WorkList** frame is displayed.



To receive the Worklist, press the relevant button; if required, you can filter the search using **From** and **To** dates, **Patient's information** and **modality (CR, DX, ALL)**.

Press the **Worklist** key to receive the studies that meets the criteria entered.



Once you receive the Worklist, use the keys on the right-hand side of the frame, to:



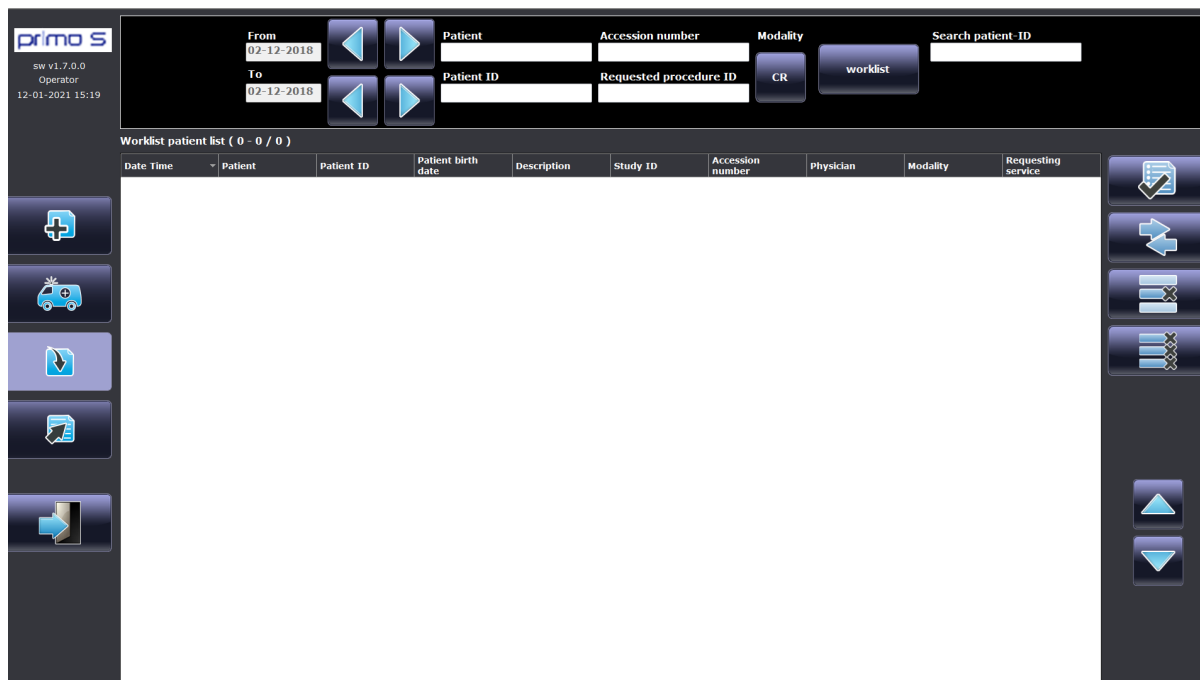
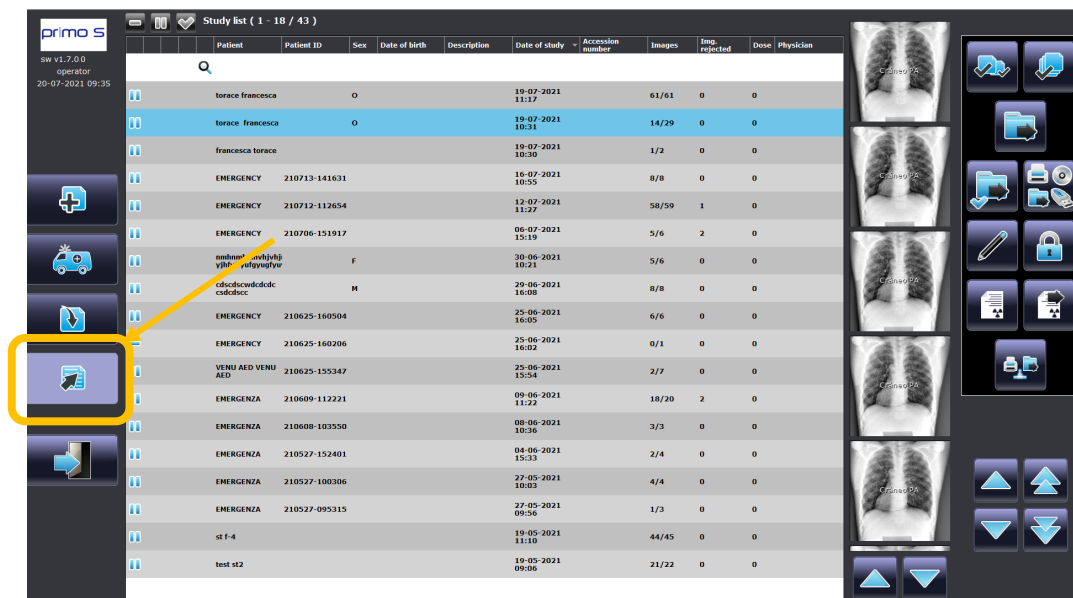
- A. Accept** one or more selected elements
- B. Merge** selected patient with local patient
- C. Delete** one or more selected study
- D. Delete all** the Worklist received
- E. Browse into the Worklist**

Select the study (or studies) required, press the **Accept** button to transfer the selected elements to the Study list.

1.3.1 RECEIVING STUDIES FROM WORKLIST

The DICOM Worklist function lets you receive a list of required studies from RIS.

- Open the **Worklist** menu using the relevant command:



- Opening the Worklist frame, the list is already set, by default, on the current day.
- To request the Worklist:

- Set the **From** and **To** dates, if required. You can scroll through dates, using tips. Click once to scroll day by day, keep press to scroll faster.

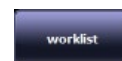


- Set the EXAM TYPE MODALITY to request by selecting DX, CR, DR or ALL:



- It is possible to filter studies to receive from the Worklist, by:
 - Patient name,
 - Patient ID,
 - Accession number,
 - Requested procedure ID.

- Finally request the Worklist by touching the relevant command:

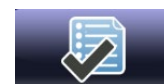


Date Time	Patient	Patient ID	Patient birth date	Description	Study ID	Accession number	Physician	Modality	Requesting service
02-09-2018 17:00:00	ALIGHIERI DANTE	PAT001005	05-12-1920	Pr. COMPLETE SKULL SL. COMPLETE SKULL		112233445566	Phys: Dott. ZIVAGO	DX	Chirurgia
02-09-2018 15:00:00	BERTAZZA GIOVANNA	PAT001003	01-10-1960	Pr. COMPLETE KNEE SL. COMPLETE KNEE		135792468	Phys: Dott. SISTERON	DX	Sala Gessi

Note: In DICOM setup menu, it is possible to set a series of parameters that will be used to filter the Worklist you are receiving. The parameters selected will be compared to those of studies already received from the Worklist. If selected parameters match with those of a study present in the Worklist you are receiving, this study will not be shown.

After receiving the Worklist, select the needed study/studies. Now you can:

- **Transfer one or more selected studies to the Study List:**



- if you transfer a single study, the acquisition frame is automatically opened,
- if you transfer more studies, the Study list frame will be opened,
- different studies of the same patient (multi-study) are transferred in the Study List all at once; then, the acquisition frame is opened with the first one,
- if the study received from the worklist defines the exams to perform, when the acquisition frame is opened, these exams are automatically loaded.

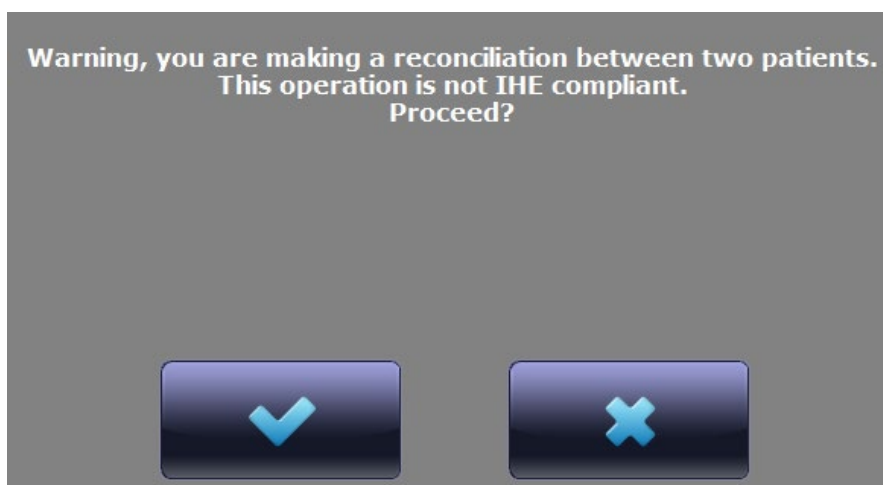
- **Merge:** this function allows to replace data of a study already present in (local) Study List with data of a study selected from **Dicom Worklist**.
Press the indicated key: a pop-up, showing (local) Study List appears.
Select the needed study and press the **Confirm** key.



Attention: make sure the correct studies have been selected. This operation is under the user responsibility, only.



Attention: local patient data will be permanently replaced by data of the selected patient.
This operation is not IHE compliant. You will be required to confirm the operation.



- **Delete** one or more selected studies



- **Delete the whole list**



- **Browse** into the list.



2 SAFETY

2.1 WARNINGS

2.1.1 SYMBOLS USED

Other symbols are used on the EM equipment, on the serial n° plate and in this manual, as follows:



Follow the instructions for use (ISO 7010-M002)



Operating instructions (ISO 7000-1641)



Name and address of manufacturer



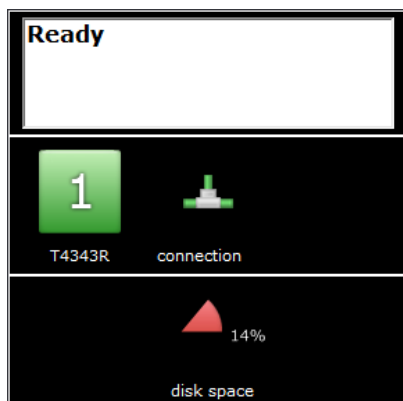
Radio wave emitting device



Device compliant with the relevant European Directive, with certain operating restrictions concerning radio wave transmission

2.1.2 WARNINGS IN THE MESSAGE AREA

The message area in the Working frame provides you with information on EM equipment status and alarm messages, detector connection status and the amount of free space on the video processor archive hard disk:



EM equipment status and alarms

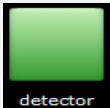
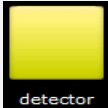
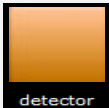
(see Table 1)

Detector and Connection status messages

(see Tables 2)

Percentage of free space on archive disk for image archiving

Table 1	
<u>EM Status message</u>	Meaning
READY	The equipment is ready to acquire images. You can give the X-ray emission command.
ACQUISITION PREP	Preparing for acquisition. This occurs after giving the X-ray preparation.
READY FOR ACQUISITION	Preparation completed. The system waits to receive an acquisition request.
IMAGE ACQUISITION	Transferring images from the detector.
DETECTOR NOT CONNECTED	The detector is not correctly connected.
LOW BATTERY, RECOMMENDED TO CHANGE BATTERY	It is recommended to change the battery of the Wi-Fi Detector. Attention: if the battery charge falls below 10% , the system will not be able to acquire new images . Change the battery to restore the complete functionality of the equipment.

Table 2			
<u>Detector status messages</u>			
	READY	NOT READY	NOT CONNECTED
Detector status			
Wired Detector	 The detector is connected.		
Wi-Fi Detector	 The power of the Wi-Fi signal is shown aside the icon.		

Attention: When the Wi-Fi signal value falls below a set value, the system **will not be able to acquire new images** (see paragraph 1.5.1.1 in Part 1 of the Technical Manual).

Check your connection to restore the complete functionality of the equipment.

2.2 DETECTORS LIST

Flat Panel available	See Paragraph
CANON AR-A3543W	2.2.1
CANON AR-A4343W	2.2.1
CANON FDXA3543RPW	2.2.2
CANON FDXA4343RPW	2.2.2
IRAY Mars 1717 V1	2.2.3
IRAY Mars 1717 V2	2.2.3
IRAY Mars 1717 V3	2.2.3
IRAY Mars 1717 X	2.2.3
IRAY Mars 1417 V1	2.2.3
IRAY Mars 1417 V2	2.2.3
IRAY Mars 1417 V3	2.2.3
IRAY Mars 1417 X	2.2.3
PIXIUM 4143	2.2.4
PIXIUM 4343	2.2.4
PIXIUM 4343RE	2.2.4
PIXIUM 3543EZ	2.2.5
PIXIUM 2430EZ	2.2.5
PIXIUM 3543EZg	2.2.5
PIXIUM 3543EZe	2.2.5
PIXIUM 3543DRcs	2.2.6
PIXIUM 3543DRgs	2.2.6
PIXIUM 3543DRcx	2.2.6
TOSHIBA 4343RPW (With AED/Without AED)	2.2.7
TOSHIBA 3543RPW (With AED/Without AED)	2.2.7
TOSHIBA 3543RPWB	2.2.7
TOSHIBA 2530RPW	2.2.7
TOSHIBA 4343R	2.2.8
TOSHIBA FDXA4343R	2.2.8

2.2.1 CANON AR SERIES WI-FI DETECTOR



Item	Colour	Description
1	--	On/Off button (keep the button pressed for at least 3 seconds)
2	Blue	Led: the detector is on Blinking if the battery level is low or if there is an error during acquisition
3	Green	Led: detector is ready to perform an exposition Blinking during exposure preparation
4	Blue green	Led: the detector is connected Blinking during detector registration or image transmission

Insert the battery in its compartment as shown in the figure below:



Lock the battery in position, moving the two levers in the direction shown in the figure:



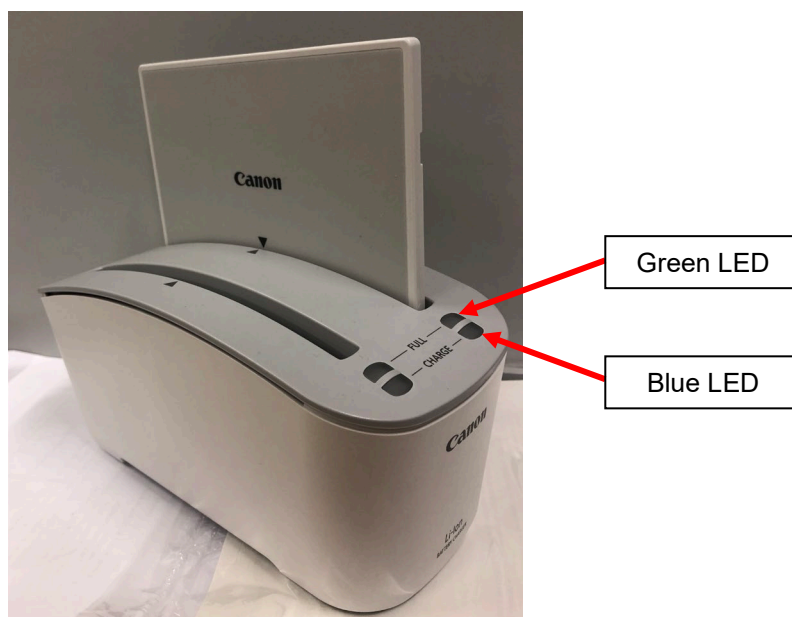
Press the ON/OFF button for 3 seconds to switch the detector off.



Attention: ONLY remove the battery after switching off the detector (ON/OFF button).

2.2.1.1 BATTERY CHARGER

The battery charger is provided with two compartments for the batteries and with LEDs that indicate the charging status.



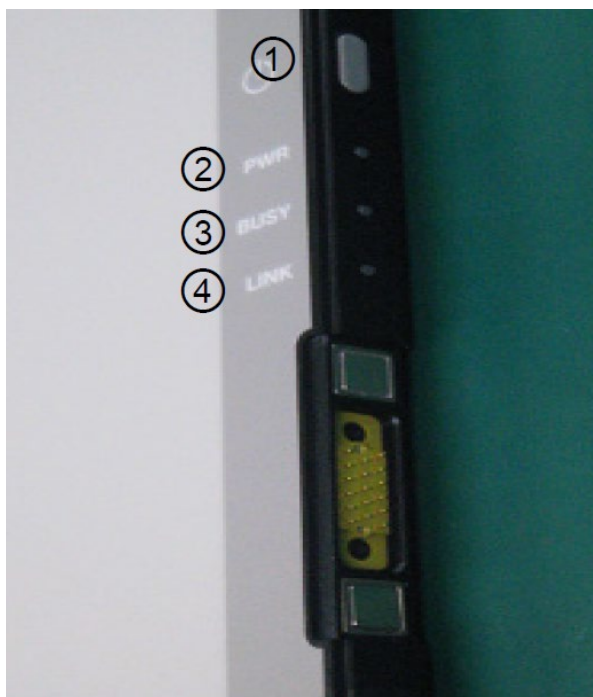
LED	COLOUR	DESCRIPTION
Charging	Blue	Battery charging
	Green	Battery fully charged



The life of a battery may be compromised if you remove it from the charger before the battery is fully charged.



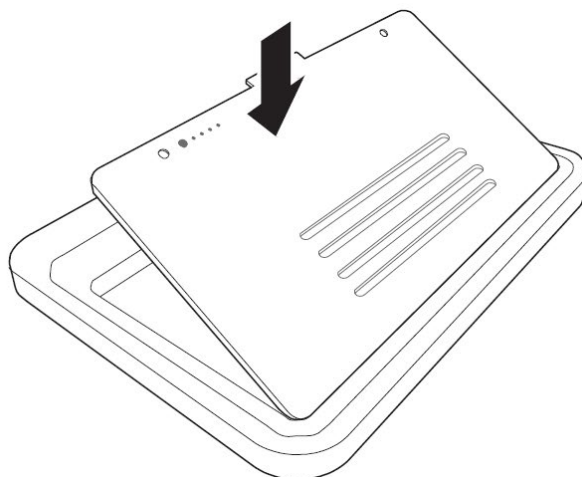
Place the battery charger in a well-ventilated position.

2.2.2 CANON FDXW WI-FI DETECTOR

The maximum load the entire surface of the FPD could tolerate is approximately 1471N (150 kg), while the central area (diameter: 40 mm) could tolerate approximately 981N (100 kg).

Item	Colour	Description
1	--	Button for turning on and off the detector (keep the button pressed for at least 2s)
2 PWR led	Blue	Led: the detector is on
3	Green	Led: it is lit when the detector is busy (usually when turning on)
4	Blue / Green	Led: Blinking blue when the detector is connected via cable. Green when it is connected via WiFi

- Insert the battery in its compartment, as shown in the figure below.

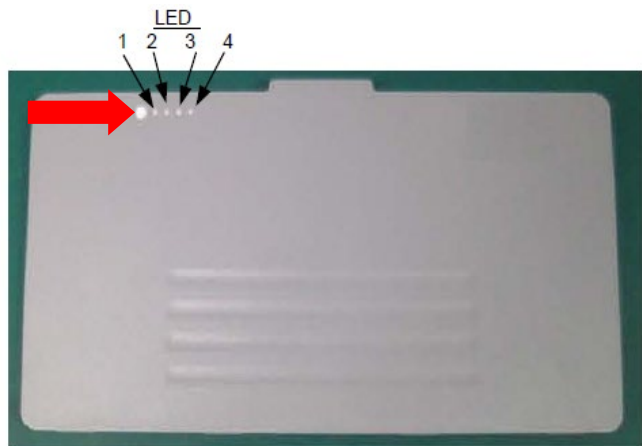


- Make sure that the battery is safely fixed and the two levers, marked with arrows, are in the position shown.



- The battery charge level can be verified by pressing the button shown in the following picture. The LEDs 1 - 4 will light up for a short moment, according to the battery charge level.

LED	CHARGE LEVEL
LED 1,2,3,4 light on	76 ÷ 100%
LED 1,2,3 light on	51 ÷ 75%
LED 1,2 light on	26 ÷ 50%
LED 1 light on	11 ÷ 25%
LED 1 Dimming (about 0.5sec interval)	< 10%



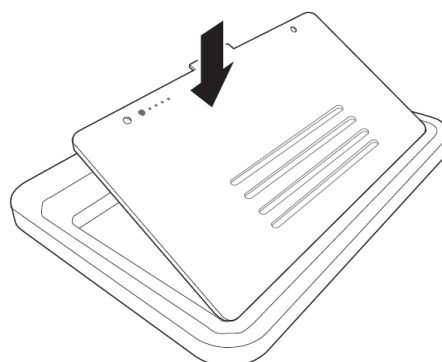
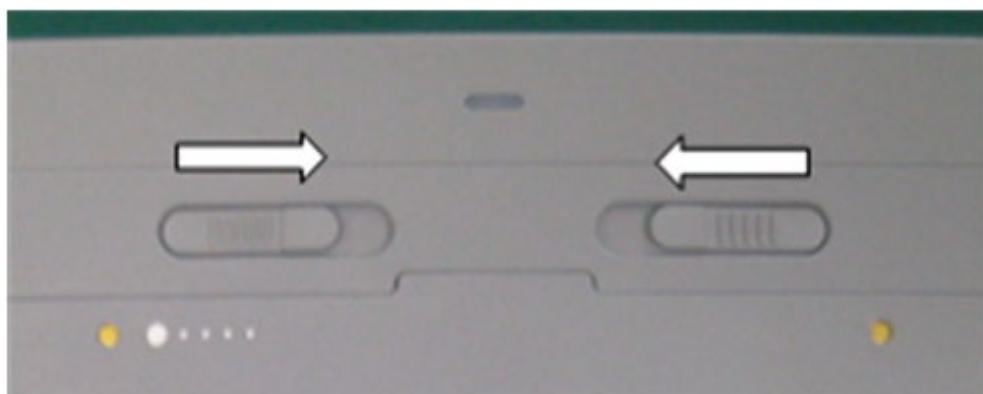
- Turn ON** the detector by pressing for 2 seconds the power button and wait for the PWR LED to turn on; after then, the BUSY and LINK LEDs will turn on, respectively. After about 1 minute, the detector will be ready to be used.



- Turn OFF** the detector by pressing the button until the PWR LED turns off.



Remove the battery, only if the detector is OFF, moving the levers as shown in the figure below (follow the direction of the arrows) and place it in the **battery charger**.



2.2.2.1 BATTERY CHARGER

The status LED can light up in 2 colours:

- **Red:** battery charging
- **Green:** charging completed.



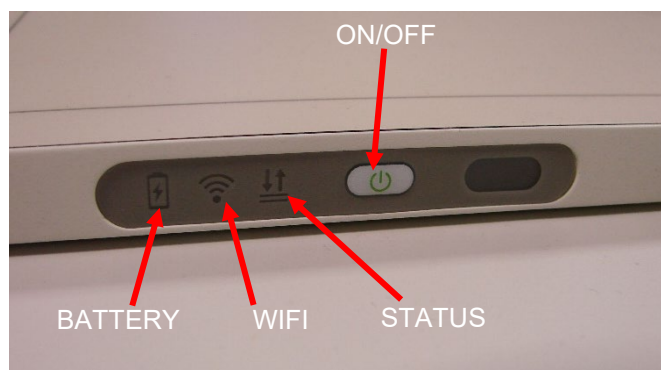
“Full Charge” LED



The life of a battery may be compromised if you remove it from the charger before the battery has been fully charged.

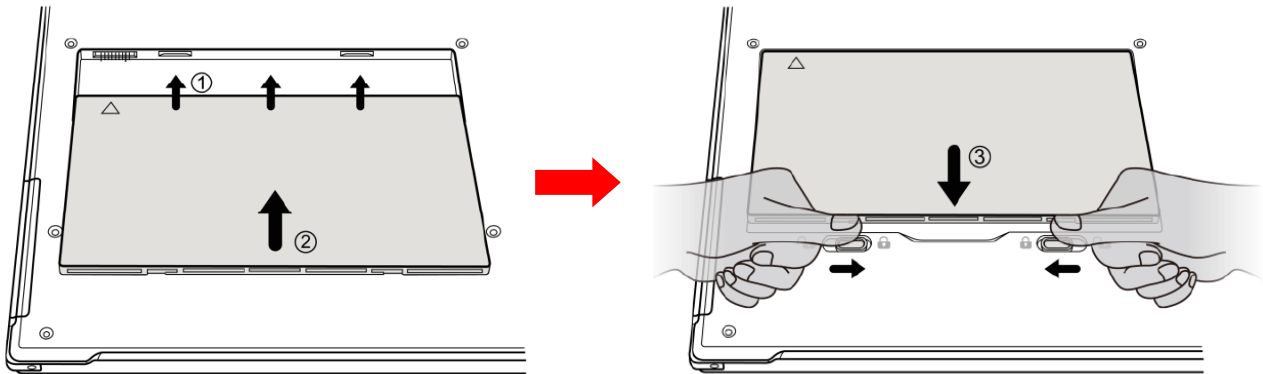
A fully charged battery allows the detectors to work for 1300 shots (cycle time: 8 seconds, capturing time 0,5 seconds); in sleep mode, the battery lasts for 4 hours.

The battery gets fully charged in 2.5 hours. It is possible to charge only one battery at time.

2.2.3 IRAY DETECTOR

LED NAME	LOGO	COLOUR	DESCRIPTION
ON/OFF		/	On/Off button (keep the button pressed for at least 3 seconds)
Battery		Off	No battery Power off
		Orange: blinking	Battery charge level lower than 10% DC input
		Orange	Battery charge level lower than 10% No DC input
		Green: blinking	Battery level higher than 10% DC input
		Green	Battery level higher than 10% No DC input
WIFI		Off	WIFI disabled Detector switched off Detector starting up
		Blue: blinking	Wireless connection ready Detector not connected to the Access Point
		Blue	Wireless connection ready Wireless Access Point is ready
		Green	Detector connected to the Access Point
		Green: blinking	Detector initialization
Status		Off	Detector switched off
		Orange: blinking	Internal error (to reset this error <i>see Paragraph 4.1.8.2 in Part 1 of the Technical Manual</i>)
		Orange	Operating mode: initialization
		Green	Operating mode: ready

Insert the battery in its compartment and then slide the battery lock lever, as shown in the figure below:



Press the ON/OFF button for about 4 seconds until the STATUS LED starts flashing (green). Wait until LEDs light up.

Press the ON/OFF button for 4 seconds to switch the detector off.



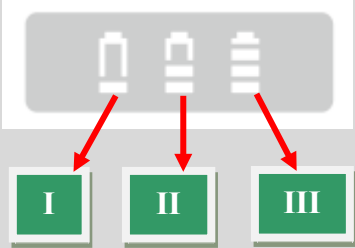
Attention: ONLY remove the battery after switching off the detector (ON/OFF button).

2.2.3.1 BATTERY CHARGER

The battery charger is provided with two compartments for the batteries of the detector.



On the battery charger **power and status LEDs** are present:

LED NAME	LOGO	COLOUR	DESCRIPTION
Power		Off	No external DC adaptor input
		Green	External DC adaptor input
Status		I, II and III off	No battery insert
		I blinking, II and III off	Battery charging ≤ 30%
		II blinking, I and III off	Battery charging between 30% and 60%
		III blinking, I and II off	Battery charging between 60% and 95%
		I and II off, III on	Battery charging > 95%
		I, II and III on	Full charge



The life of a battery may be compromised if you remove it from the charger before the battery is fully charged.



Place the battery charger in a well-ventilated position.

2.2.4 PIXIUM 4143 / 4343 DETECTOR

There are 5 LEDs on the PIXIUM 43x43 detector, as described in Table 6:

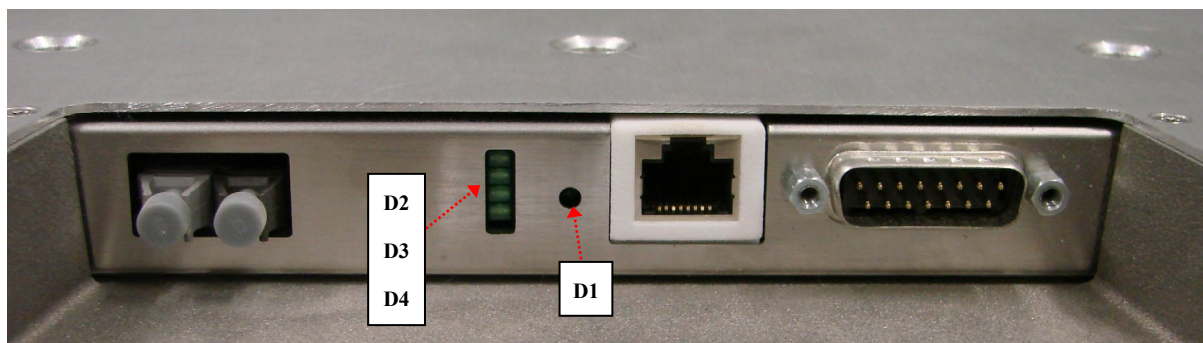
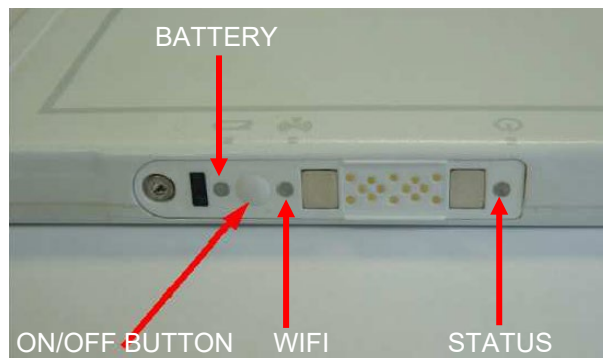


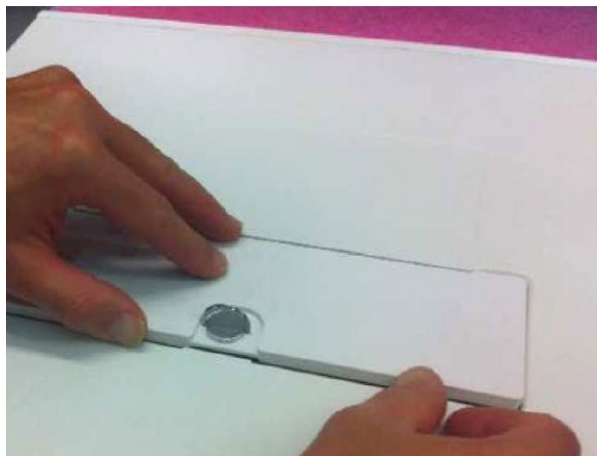
table 6		
LED	NAME	DESCRIPTION
D1	POW_OK	ON = Detector powered up. OFF = Error in external power supply for the detector.
D2	DET_OK	ON = Microcontroller initialising successful. OFF = Microcontroller initialising failed.
D3	COM_OK	ON = Communication between video processor and detector established. OFF = Communication problem found.
D4	FREQ_OK	ON = In standby. OFF = During the acquisition of an image.
D5	XRAY_OK	ON = During appearance of the X-ray window. OFF = Between two X-ray windows.

2.2.5 PIXIUM EZ WIRELESS DETECTOR



LED NAME	LOGO	COLOUR	DESCRIPTION
ON/OFF		/	On/Off button (keep the button pressed for about 1 second)
Battery		Off	No battery FPD off Detector starting up
		Orange: fast flashing	Battery level less than 5% its full charge
		Orange	Battery level less between 5% and 10% its full charge
		Green	Battery level more than 10% its full charge
WIFI		Off	WIFI disabled Detector switched off Detector starting up
		Orange	Detector not connected to the Access Point
		Green	Detector connected to the Access Point
Status		Off	Detector switched off
		Orange: slow flashing	Internal error
		Orange	Operating mode: OFFLINE
		Green: slow flashing	Operating mode: LISTEN
		Green	Operating mode: READY

Insert the battery in its compartment, as shown in the figure below.
Turn the battery lock clockwise (lock):

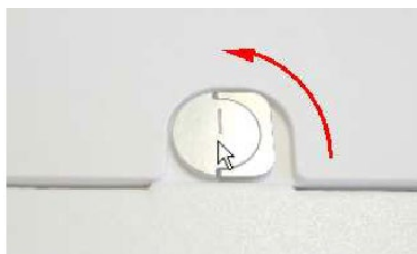


Press the ON/OFF button shown below (for about 1s) until the STATUS LED starts flashing (orange).



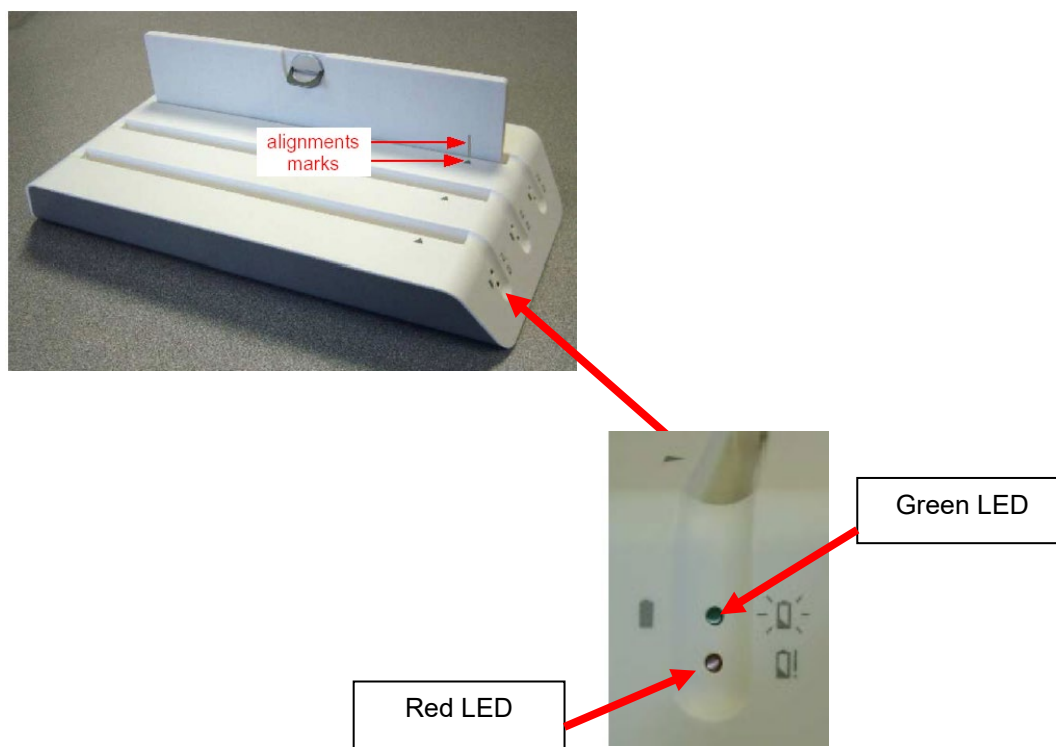
Wait until all 3 LEDs light up.

Press the ON/OFF button until the STATUS LED starts flashing orange (after about 5s) to switch the detector off.



Attention: ONLY remove the battery after switching off the detector (ON/OFF button).

2.2.5.1 BATTERY CHARGER



LED NAME	COLOUR	DESCRIPTION
Charging	Green, flashing	Battery charging
	Green	Battery fully charged
Charging status	Red	Battery charging not possible

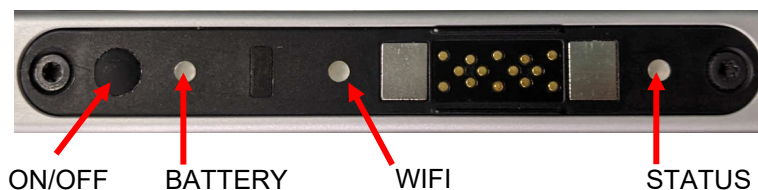


The life of a battery may be compromised if you remove it from the charger before the battery is fully charged.



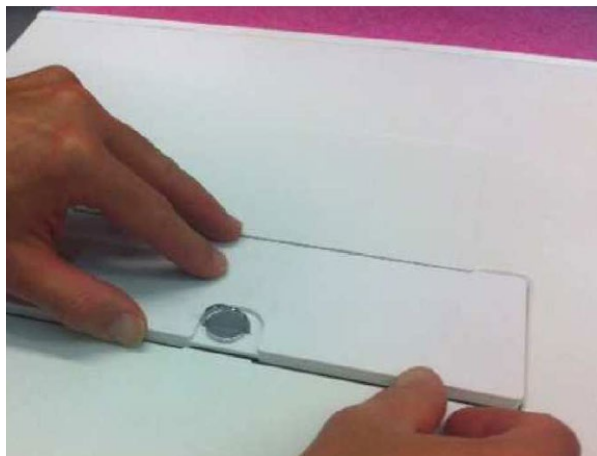
Place the battery charger in a well-ventilated position.

2.2.6 PIXIUM DR WIRELESS DETECTOR



LED NAME	LOGO	COLOUR	DESCRIPTION
ON/OFF		/	On/Off button (keep the button pressed for about 1 second)
Battery		Off	No battery FPD off Detector starting up
		Orange: fast flashing	Battery level less than 5% its full charge
		Orange	Battery level less between 5% and 10% its full charge
		Green	Battery level more than 10% its full charge
WIFI		Off	WIFI disabled Detector switched off Detector starting up
		Orange	Detector not connected to the Access Point
		Green	Detector connected to the Access Point
Status		Off	Detector switched off
		Orange: slow flashing	Internal error
		Orange	Operating mode: OFFLINE
		Green: slow flashing	Operating mode: LISTEN
		Green	Operating mode: READY

Insert the battery in its compartment, as shown in the figure below.
Turn the battery lock clockwise (lock):

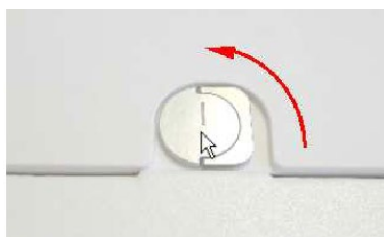


Press the ON/OFF button shown below (for about 1s) until the STATUS LED starts flashing (orange).



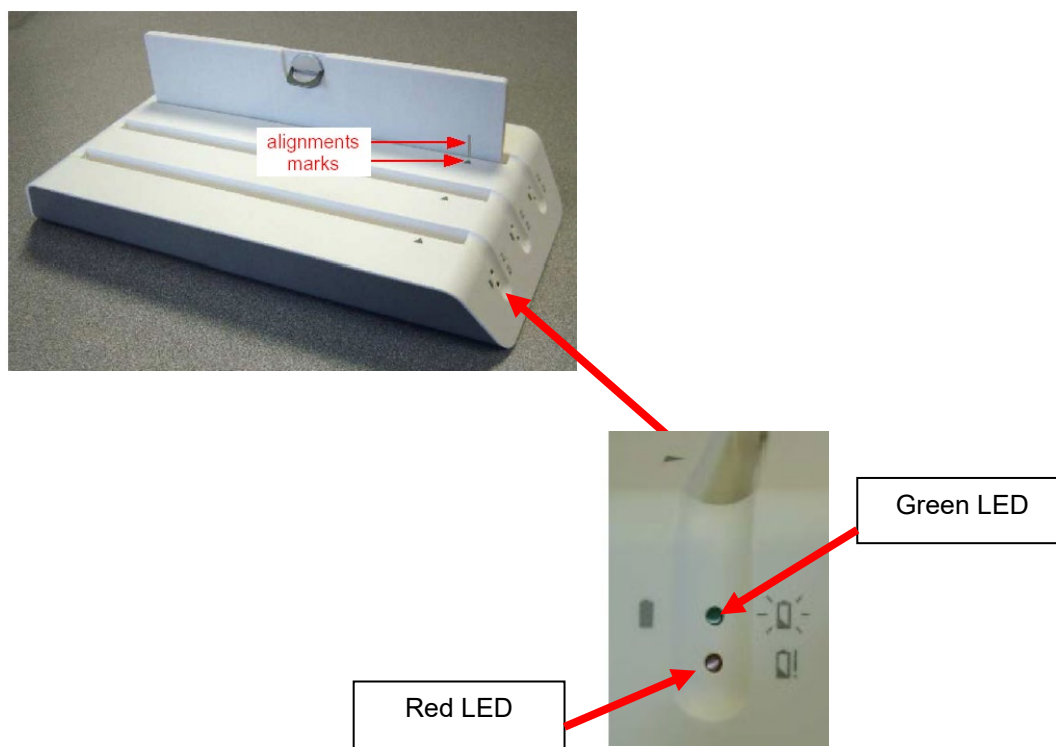
Wait until all 3 LEDs light up.

Press the ON/OFF button until the STATUS LED starts flashing orange (after about 5s) to switch the detector off.



Attention: ONLY remove the battery after switching off the detector (ON/OFF button).

2.2.6.1 BATTERY CHARGER



LED NAME	COLOUR	DESCRIPTION
Charging	Green, flashing	Battery charging
	Green	Battery fully charged
Charging status	Red	Battery charging not possible

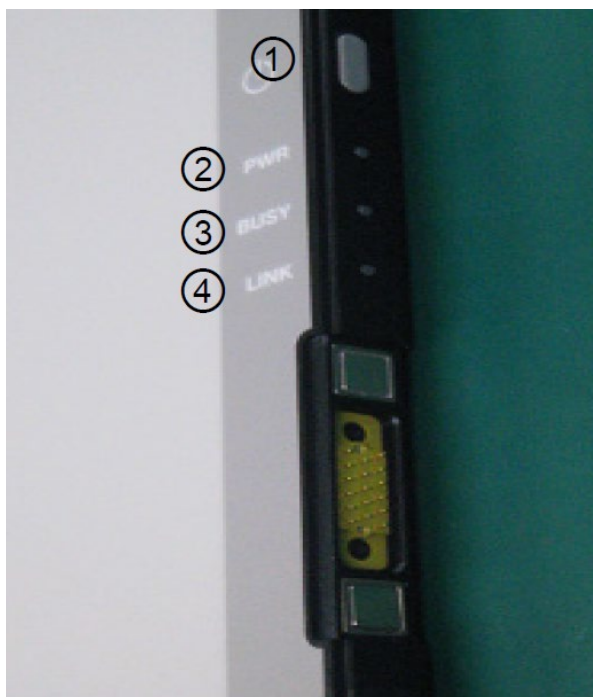


The life of a battery may be compromised if you remove it from the charger before the battery is fully charged.



Place the battery charger in a well-ventilated position.

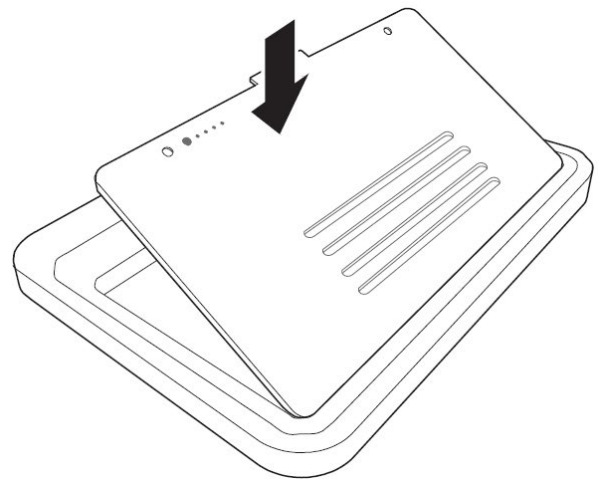
2.2.7 TOSHIBA FDXW WI-FI DETECTOR



The maximum load the entire surface of the FPD could tolerate is approximately 1471N (150 kg), while the central area (diameter: 40 mm) could tolerate approximately 981N (100 kg).

Item	Colour	Description
1	--	Button for turning on and off the detector (keep the button pressed for at least 2s)
2 PWR led	Blue	Led: the detector is on
3	Green	Led: it is lit when the detector is busy (usually when turning on)
4	Blue / Green	Led: Blinking blue when the detector is connected via cable. Green when it is connected via WiFi

- Insert the battery in its compartment, as shown in the figure below.

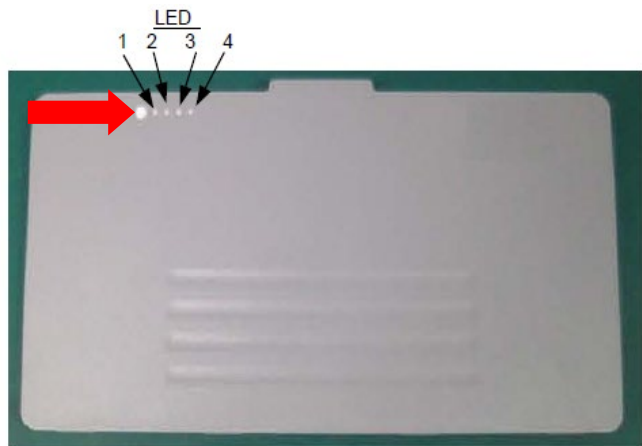


- Make sure that the battery is safely fixed and the two levers, marked with arrows, are in the position shown.



- The battery charge level can be verified by pressing the button shown in the following picture. The LEDs 1 - 4 will light up for a short moment, according to the battery charge level.

LED	CHARGE LEVEL
LED 1,2,3,4 light on	76 ÷ 100%
LED 1,2,3 light on	51 ÷ 75%
LED 1,2 light on	26 ÷ 50%
LED 1 light on	11 ÷ 25%
LED 1 Dimming (about 0.5sec interval)	< 10%



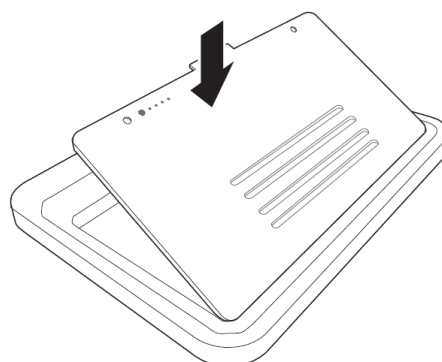
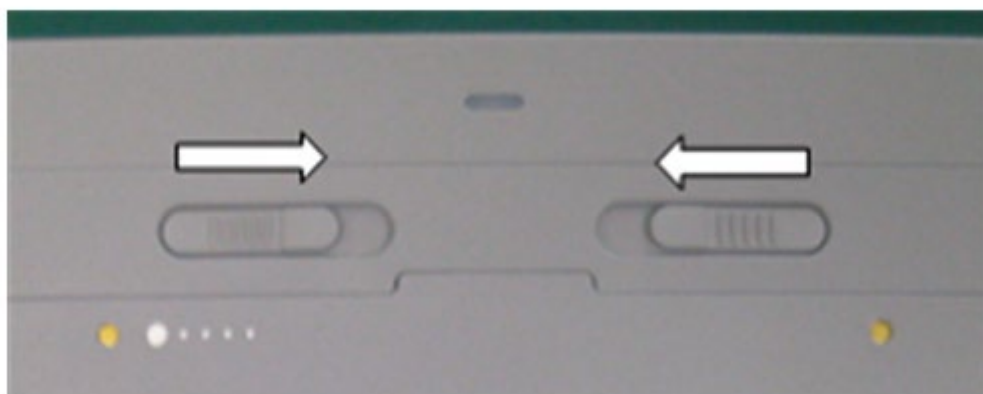
- Turn ON** the detector by pressing for 2 seconds the power button and wait for the PWR LED to turn on; after then, the BUSY and LINK LEDs will turn on, respectively. After about 1 minute, the detector will be ready to be used.



- Turn OFF** the detector by pressing the button until the PWR LED turns off.



Remove the battery, only if the detector is OFF, moving the levers as shown in the figure below (follow the direction of the arrows) and place it in the **battery charger**.



2.2.7.1 BATTERY CHARGER

The status LED can light up in 2 colours:

- **Red:** battery charging
- **Green:** charging completed.



“Full Charge” LED



The life of a battery may be compromised if you remove it from the charger before the battery has been fully charged.

A fully charged battery allows the detectors to work for 1300 shots (cycle time: 8 seconds, capturing time 0,5 seconds); in sleep mode, the battery lasts for 4 hours.

The battery gets fully charged in 2.5 hours. It is possible to charge only one battery at time.

2.2.8 TOSHIBA FDX4343R DETECTOR



LED	Colour	Description
1	Green	POWER: When +24V is input
2	Green	HEALTHY: FPD retains the normal status
3	Green	NETWORK: Normal communication status
4	Green	IMAGING: - Radiography status, EXP_OK output period; - READOUT

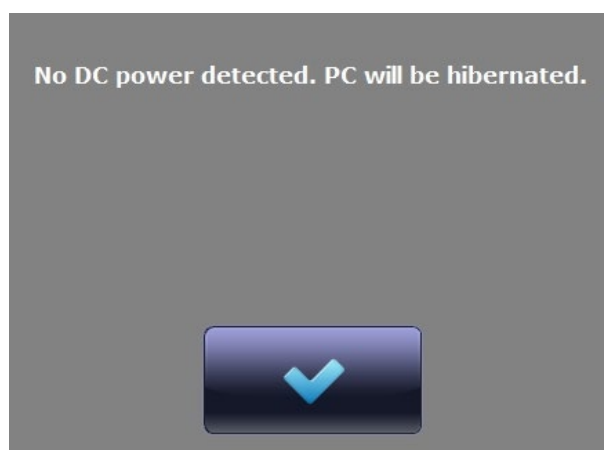
For preparation and connection stages, see *Chapter 2 in Part 1 of the Technical manual*.

2.3 MESSAGES ON MOVING UNITS

The following messages are **only** present on Mobile units or Portable Units.

2.3.1 MESSAGE ON PORTABLE UNIT

Status message	Meaning
No DC power detected. PC will be hibernated	Every time the device is not connected to the mains, it automatically turns to hibernation state.



2.3.2 MESSAGES ON MOBILE UNIT

Status message	Meaning
LOW BATTERY LEVEL. Operation is allowed. For better battery usage, it is recommended to connect the unit to a power source.	Battery level is 10%. Please, plug the device to mains power supply.
VERY LOW BATTERY LEVEL. Operation is allowed although it is urgent to connect the unit to a power source.	Battery level is 5%. It is required to plug the device to mains power supply.
The X ray unit has not been used for 30 minutes and will be shut down in 15 minutes unless you connect it to the power source or you click here.	After 30 minutes of inactivity, the device prepares to shut down in 15 minutes. To avoid the automatic shutdown, plug the device to the mains or press the Confirm key.

CRITICAL BATTERY LEVEL. Operation is not allowed. Connect the unit to a power source. Time remaining before shutdown:30:00



The X ray unit has not been used for 30 minutes and will shutdown in 15 minutes unless you connect it to the power source or you click here.



2.4 ETHERNET SETUP

This procedure is only needed when the equipment is supplied with DICOM functions (optional).

The Responsible Organization is accountable for changing settings to suit the network to which the EM equipment is connected.

Connecting the equipment to the IT-network, the Responsible Organization should also consider that:

- connection of the equipment to an IT-NETWORK that includes other equipment could result in previously unidentified risks to **patients, operators or third parties**;
- Subsequent changes to the IT-network could introduce new risks and require additional analysis; changes to the IT-network include:
 - changes in the IT-network configuration,
 - connection of additional items to the IT-network,
 - disconnecting items from the IT-network,
 - update of equipment connected to the IT-network,
 - upgrade of equipment connected to the IT-network.

Warning: *The Responsible Organization should identify, analyze, evaluate, and control these risks in compliance with IEC 80001-1:2010 standard.*

2.5 NETWORK SAFETY

The manufacturer provides the Software free of malwares and viruses; this is assured by the continuous updating of an antivirus that check the software.



The Installer shall configure the system to be protected by a Firewall.



The Installer shall create a backup copy of the system when the installation procedure has been completed to restore it in case of problems.

Part 2 : USE

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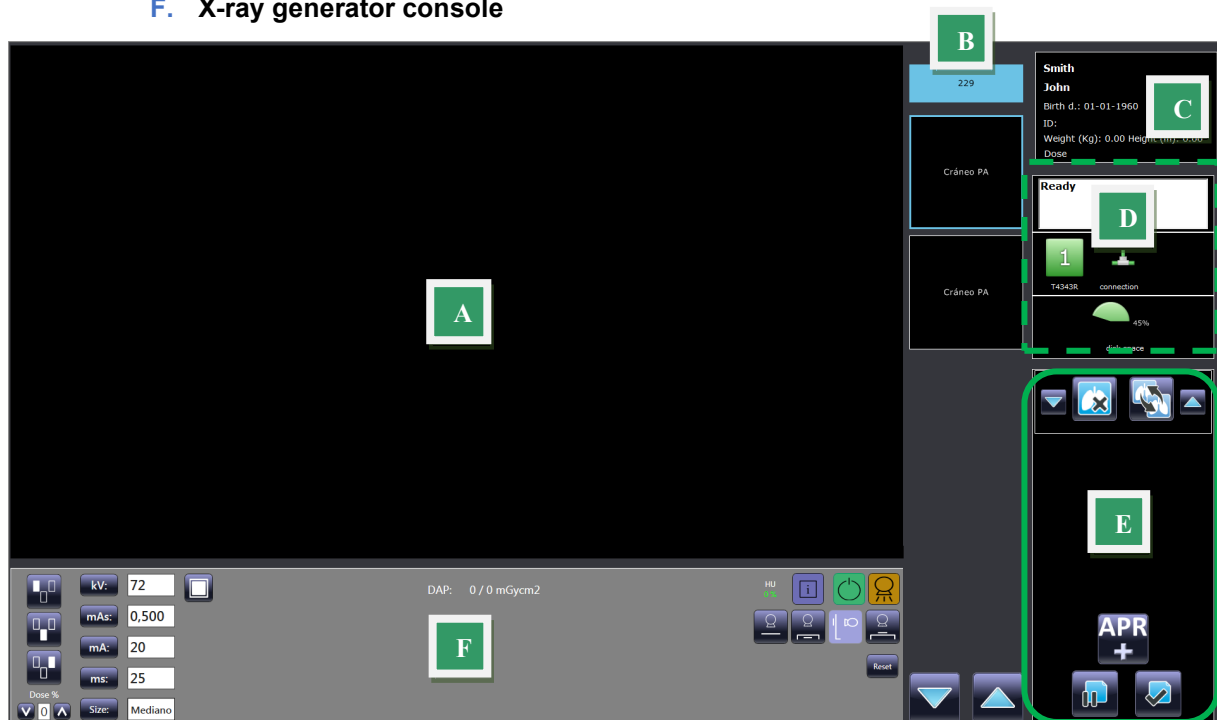
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1 WORKING FRAME AND IMAGE ACQUISITION

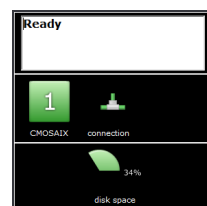
1.1 WORKING FRAME

The Working frame is split into the following sections:

- A. Image area
- B. Exam List / Preview List
- C. Patient data
- D. Detector status and messages / free space on HD
- E. Exam management area
- F. X-ray generator console



- A) **Image area:** This area shows the image selected in the preview list.
- B) **Exam List / Preview List:** When you add a new exam to the study, a black box with the name of the exam is created. When the image is acquired, the black box is replaced by the preview of the image.
- C) **Patient data:** This section shows the patient's data:
 - Patient's name (or Emergency number if you are using the emergency mode),
 - Birth date,
 - Patient ID,
 - Weight (Kg) and Height (m),
 - Dose given to the patient
- D) **Detector status and messages / free space on HD:** This area shows messages concerning the detector connections, the amount of free storage space on the archive disk and messages or alarms about the equipment status.



- E) **Exam management area:** This area contains keys to delete, move or add exam to your study, and to suspend or close the study.



- Delete the selected exam (left key)
- Replace the selected exam (right key)
- Move the selected exam within the list, using up and down tips.



Add new exam



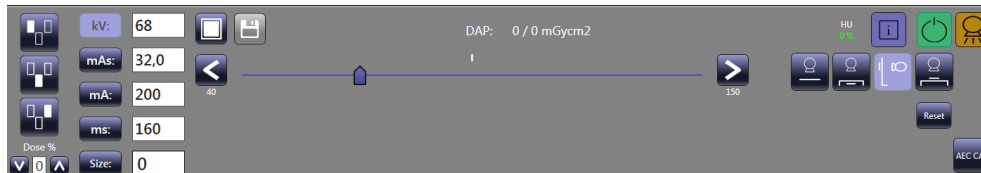
Suspend or Close the study.

Note: After an exam has been acquired, in this area will be shown keys to Reject or Retake the image. See Paragraph 1.1.2 below for further details.

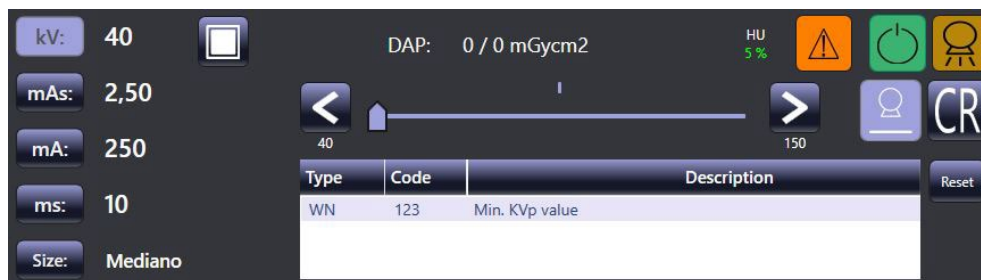
F) **X-ray generator console:**

The x-ray generator console is displayed with different options and functions depending on the EM equipment in use.

- Console available on radiographic rooms.



- Console available on mobile and portable units.



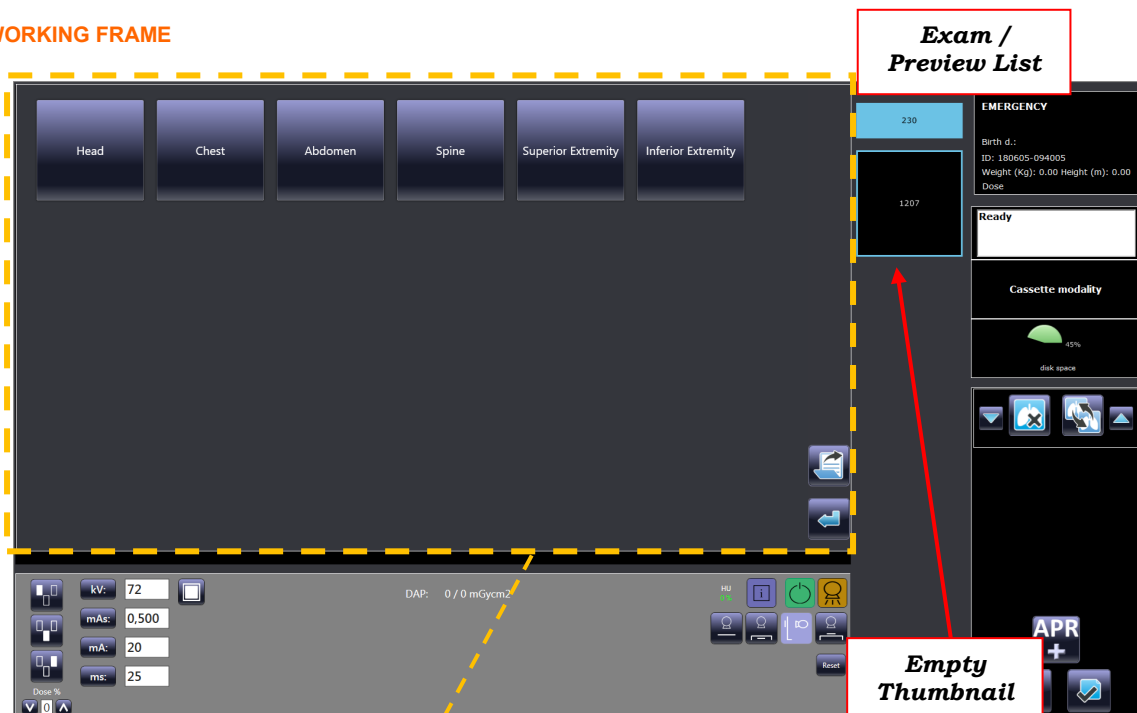
For further details, see paragraph 1.1.2 below.

The x-ray generator parameters are already set, by the manufacturer, for each kind of exam present; Eventually, the parameters can be adjusted, according with the operator, during the installation.

Anyway, you can change the parameters of the exam in use on the console (see Paragraph 1.1.2 below for further details).

When a new study is created (manually or received by Worklist), the **Working Frame** is automatically opened:

WORKING FRAME



The Working Frame will show the exam selection window. It is meant to choose the anatomical region required, then the anatomical part and finally the exam.

Select all the exams required between those provided; for each one, the corresponding (empty) thumbnail is created on the right-hand side of the Working Frame.

Pressing the relevant key, it is possible to select one or more procedures within those created in the **Procedures** setup.



Once all the needed exams have been added to the **Exam / Preview List**, press the relevant key to exit **APR** selection menu and begin the study.



To change the order of the exams in the list, select one and relocate it using the tips: the corresponding empty thumbnail is moved as well.

To delete an exam (not acquired, yet) from the list, use the key on the left.

To replace an exam (not acquired, yet) with another one from the list, use the key on the right.



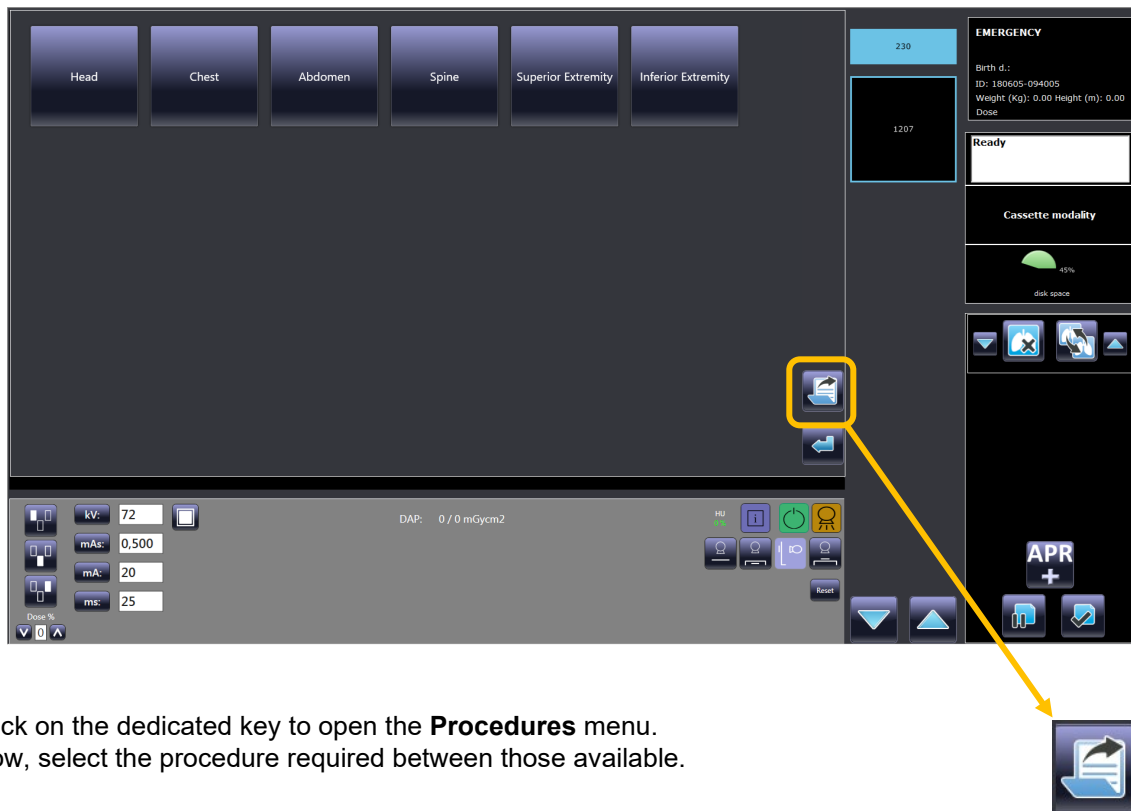
During the execution of the study, the exams will be automatically selected in the order of the preview list, starting from the first one. However, it is possible to manually select which exam to start with.

1.1.1 PROCEDURES

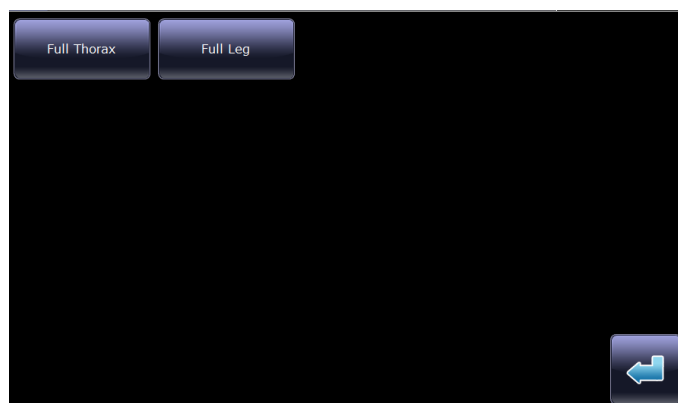
Procedures define the exams needed for the study.

Procedures are created during installation of the system, in accordance with the operators and depending on the type of work required in the radiological theatre.

A procedure can be associated to a single exam, or several ones.



Click on the dedicated key to open the **Procedures** menu.
Now, select the procedure required between those available.



Exams associated to the procedure are added in the **list**.



You can either choose the procedure manually, or it can be defined automatically from the **DICOM Worklist** services, through the specific RIS code (see *Paragraph 1.7 in Part 1 of the Technical Manual* for further details).

When a study received from the **Worklist** contains a Procedure code, the related one will be automatically associated to the study and loaded at the acquisition.

During the execution of the study, the exams will be automatically selected in the order of the preview list, starting from the first one. However, it is possible to manually select which exam to start with.

1.1.1.1 STITCHING PROCEDURES

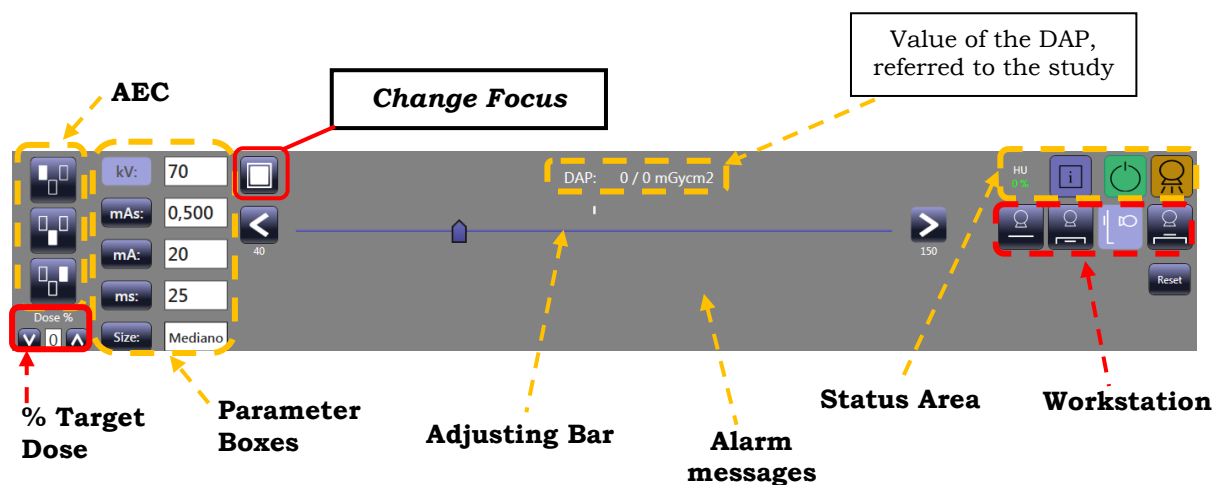
A stitching exam is performed by choosing one of the available procedures. See *paragraph 1.1.3 below* for further information about Stitching workflow.

Note: *Stitching function is **NOT** available on Mobile and Portable units.*

1.1.2 IMAGE ACQUISITION

Once you selected the exam to place, you are ready to acquire images.

- The **acquiring parameters** for the exam are already set (*in Exam Setup, see Paragraph 1.6 in Part 1 of the Technical Manual*):
 - kV, mA, mAs, ms,
 - Patient Size,
 - Focus,
 - AEC position
 - Target Dose %
 - Workstation.
- Anyway, you can adjust them, if required. Click on the relevant **Parameter Box** and change the value using the **Adjusting Bar**.



- In the **Status Area**, you can check the equipment status:

Icon	Meaning	Note
	Indication of Heat Unit of the x-ray tube.	
	When an alarm message appears in the relevant area, this icon is red (error) or orange (specific message). Once the problem has been solved (or reset the alarm message), the icon turns green.	If there are no warnings, the icon shown will be: 
	Ready icon. It lights up at the preparation x-ray button.	
	Acquiring icon. It lights up at the x-ray emission.	
	Cassette modality, available on mobile and portable units	See paragraph 1.1.2.2 below

- If you need to **add a new exam (or a new procedure)** to the current study, press the dedicated button.  Choose the type of exam required: it will be added to the **Exam list** and an empty box is created in the thumbnail column. Select it to carry the exam out.



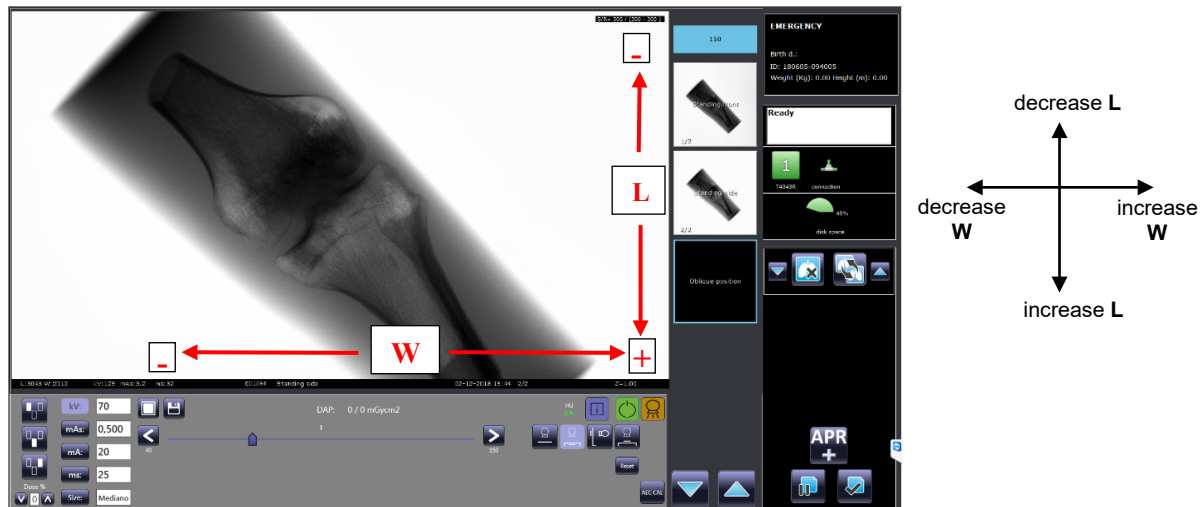
- Once you set the required parameters, use the exposure command to start an exposure. The X-ray preparation and emission stages are indicated by messages in the relevant area of the Working frame (**Acquisition Preparation**, then **Ready for Acquisition**, and finally **Image Acquisition**).



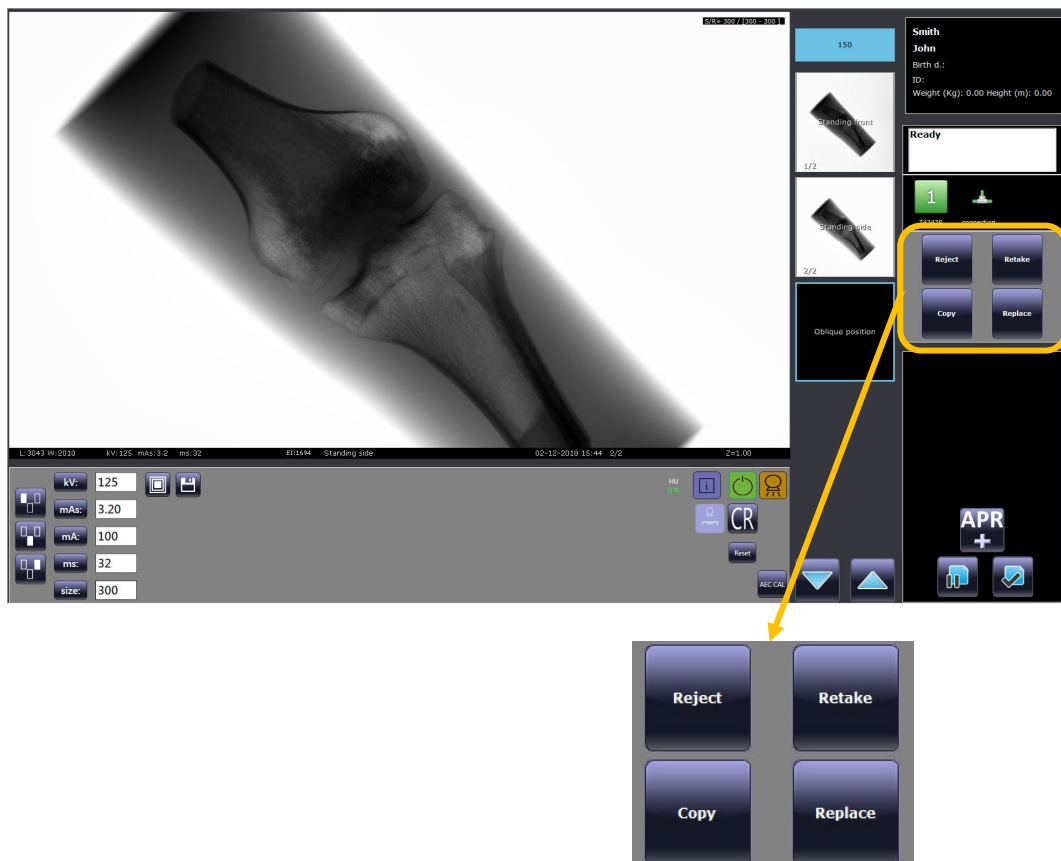
- The acquired image appears on the monitor a few seconds after the exposure command.

Attention: when you are using a **Wi-Fi detector**, if the **battery charge falls below 10%** or if the **power of Wi-Fi signal falls below a set percentage**, the system will not be able to **acquire images**.
 Change the battery or check the Wi-Fi connection to restore the system complete functionality.
 To set minimum Wi-Fi percentage, see Paragraph 1.5.1.1 in Part 1 of the Technical Manual.

1. The image acquired is shown in the center of the screen and its preview appears on the right-hand side.
2. It is possible to change the W/L values.



3. Use your finger, on the edge of the image to increase or decrease W/L values, as shown in the figure above.
Swipe horizontally to change the window value or swipe vertically to change the level one.
4. Once an image is acquired, the system automatically selects the next exam in the list, if present.
Anyway, if the image does not meet your quality standards, it is possible to reject or retake it.



5. If you want to refuse the acquired image and take it again, press the **Retake** key: you will be asked to select the reason of the rejection.
On the preview of the image will appear a red cross and the text "**REJECTED**".
The exam you were performing is duplicated right below the rejected one and it is automatically selected as the next to be performed.
6. If you want to refuse the acquired image, but you do not want to retake it, press the **Reject** key: you will be asked to select the reason of the rejection.
On the preview of the image will appear a red cross and the text "**REJECTED**".
The user must select the next exam, if any, in the list to proceed.
7. In the Study list frame, you can refer to the **Rejected image statistics**, using the relevant key (see *Paragraph 1.3 below*).
8. If you want to acquire a new image with the parameters and APR used, press the **Copy** key.
9. To correct a possible mistake when the APR has been selected, it is possible to change the APR associated to an acquired image (even at a later time) using the **Replace** key (available only for Administrator, Advanced or the operator who acquired the image).
10. Until the study status is "**Suspended**", it is possible to add new exams (thus acquiring new images), **reject** or **retake** already acquired images.



If you select an image already acquired from the Exam list, the post-processing frame is automatically opened (see *chapter 3 in this Part of the Manual* for full details).

1.1.2.1 DEVIATION INDEX INDICATION

The Deviation Index (**DI**) is used to express the difference between expected (**EIT**) and achieved (**EI**) Exposure Index.

After every exposure, the equipment indicates these three exposure values.

kV:55 mAs:25.0 ms:40 mGy_cm²:0.0 EIt:500 EI:603 **DI:0.81** Cráneo AP

The **Deviation Index** could be shown in green, yellow, or orange, depending on the "distance" between EI and EIT.

GREEN	Deviation Index value optimal.
YELLOW	Deviation Index value acceptable.
ORANGE	Deviation Index value outside the acceptable range.

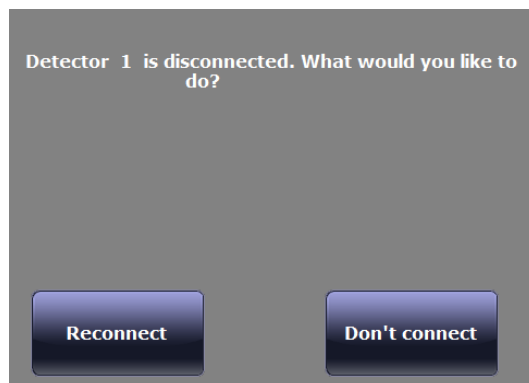
To use this function is required to program the reference exposure value for an optimally exposed image (**Target Exposure Index, EIT**) in the Exam Setup, specific for each exam (see *Paragraph 1.6.1, Part 1 of the Technical Manual*).

Furthermore, it is required to set a range in which the value is considered optimal, and a range for acceptable values (see *Paragraph 1.5.1, Part 1 of the Technical Manual*).

1.1.2.2 ORPHAN IMAGE RECOVERY

The function is available with **PIXIUM**, **CANON FDX** and **IRAY** wi-fi detectors, only.

If the detector loses the connection during the image transmission, the image is saved anyway, and the following message is shown.



To restore the connection, press the **Reconnect** key.

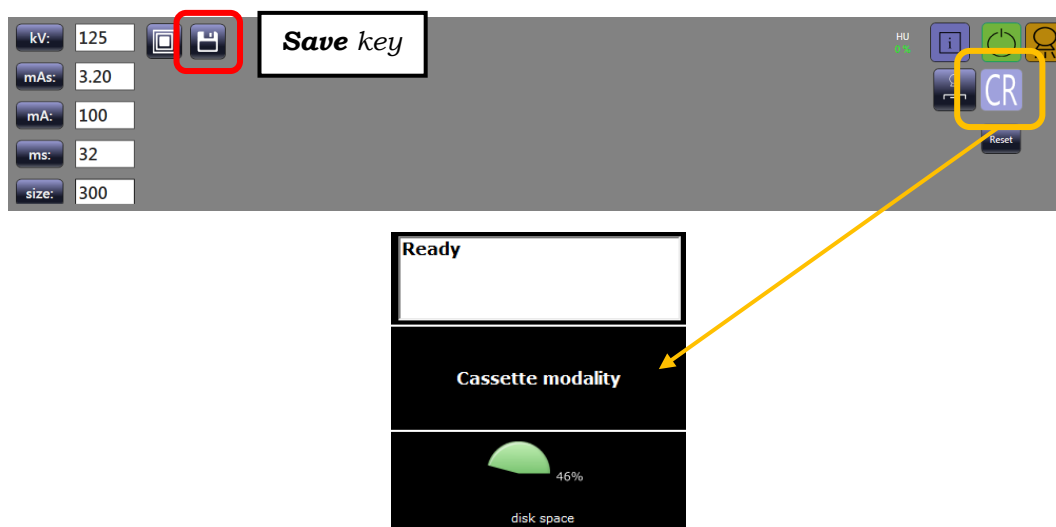
If the connection is successfully established, the system automatically recovers the last image acquired and saves it in the study.

Note: this function is no longer available if the study is closed after the disconnection or if the **Don't connect** key is pressed.

1.1.2.3 CASSETTE MODALITY

It is possible to acquire an image using a radiographic cassette instead of the detector.

Place the cassette and change the acquiring modality pressing the relevant key: in the detector status area, will appear the text "**Cassette modality**".



If the related option is enabled in **General 2 Setup**, after the acquisition a black image is displayed on the system monitor and the exposure data related to the image acquired will be added to the dose report (RDSR) of the study (see Paragraph 1.5.1.1 in Part 1 of the Technical Manual).

1.1.3 STITCHING WORKFLOW

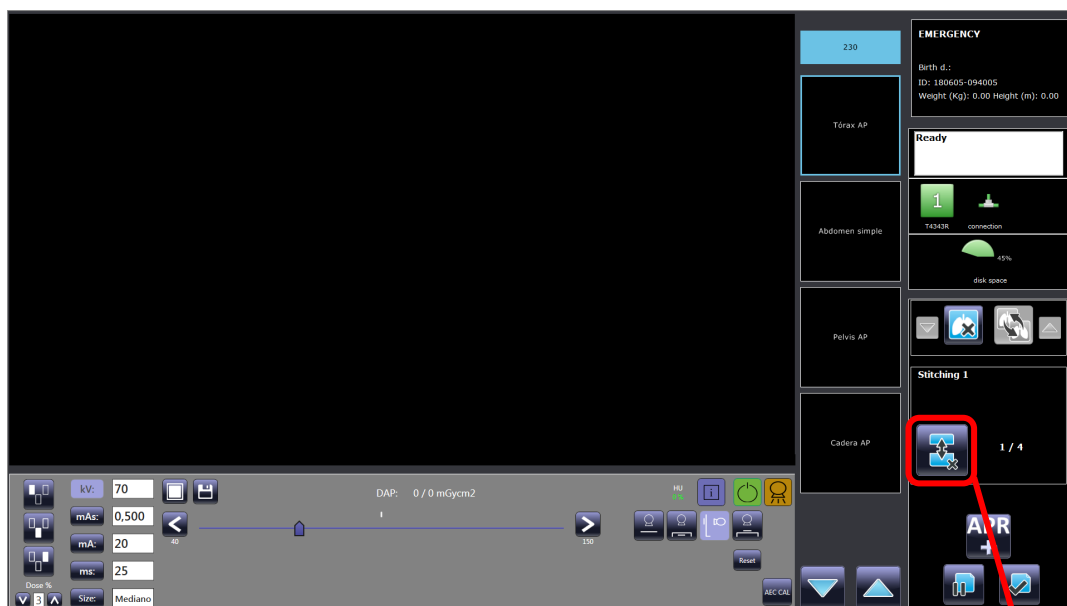
Note: Stitching is **NOT** available on Mobile and Portable units.

The Stitching procedure creates an image of great length by “sticking” some images which were acquired during a longitudinal scan of the patient.

A study could contain one or more Stitching procedures, manually selected from the APR, or received from the WorkList.

When a stitching procedure is started, it must be completed: no other exam during the procedure can be performed.

When a Stitching procedure is selected, it appears a specific panel containing the procedure name, the Abort key, and a counter.



The operator can abort a stitching procedure using the relevant button.



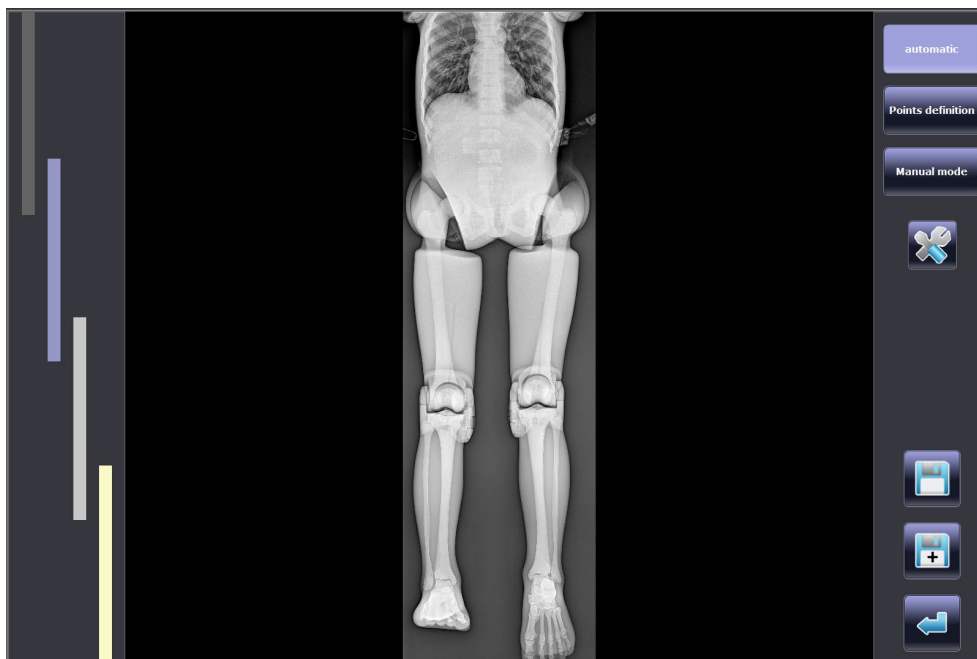
Note: if at least two images have been acquired, the reconstruction will be carried out anyway.

Aside this key, a counter shows the progression of the procedure.

If the related option is enabled in **General 2 Setup**, the stitching image reconstruction procedure is performed only after all the needed images have been acquired: the acquisition phase itself is therefore faster.

1.1.4 STITCHING IMAGE RECONSTRUCTION

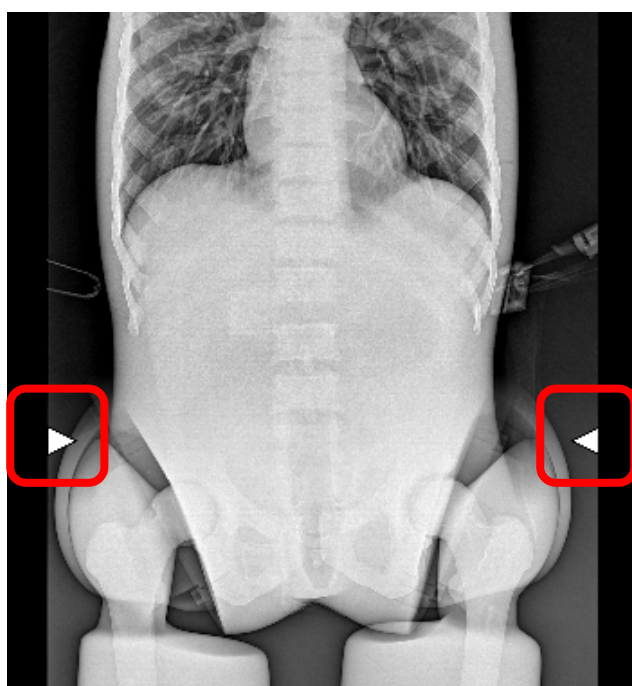
When the images required by the procedure have been acquired, or if it has been aborted after acquiring at least two images, the **Stitching Window** (in post-processing menu) is opened, and the stitched image is shown reconstructed in **Automatic modality** (see Paragraph 1.1.4.1 below).



The system evaluates the quality of the performed reconstruction by verifying the result in the overlapping areas.

If the reconstruction is evaluated as correct, the stitching lines will be highlighted with a couple of triangles, like in the image below.

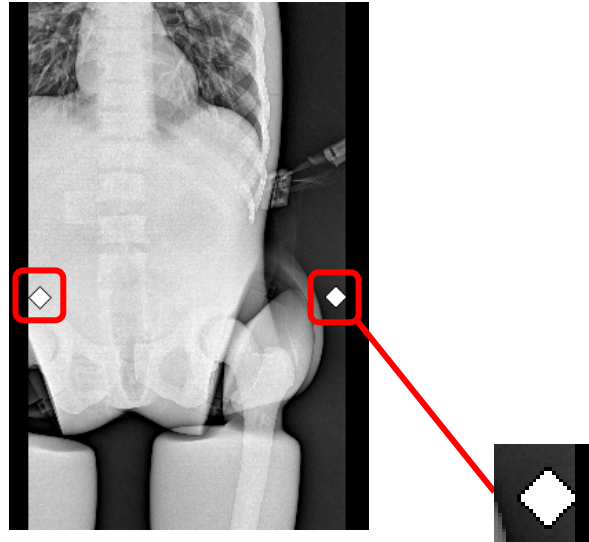
Instead, if the function considers the reconstruction to not be reliable, the stitching lines are highlighted with a couple of rectangles.



If the stitched image looks incorrect, it will be possible to adjust the reconstruction using one of the manual modalities, available in the top-right of the window (see below):

- **Points Definition** reconstruction (see paragraph 1.1.4.2 below),
- **Manual Mode** reconstruction (see paragraph 1.1.4.3 below).

In Manual Mode reconstruction, the stitching lines are indicated by rhombus.



Note: symbols used to highlight the stitching lines are only shown in post-processing frame.

On the bottom-right of the stitching window, there are the keys:

- 1 **Save**, to save the current stitched image and overwrite the original one. Then, the Stitching Window is closed.
- 2 **Save and Create**, to add the current stitched image to the preview list. Then, the Stitching Window is closed.
- 3 **Exit**.

The **Stitching Window** can be open also when the stitching image has already been created (for example, to repeat the reconstruction procedure).

In this case:

- Select a stitched image (the result of a previous stitching procedure) and press the indicated button; the **Stitching Window** will be opened in the **modality of Reconstruction** previously used.



Otherwise, it is possible to repeat the **Automatic reconstruction** procedure by:

- selecting one of the images within the stitching procedure and pressing the indicated button.



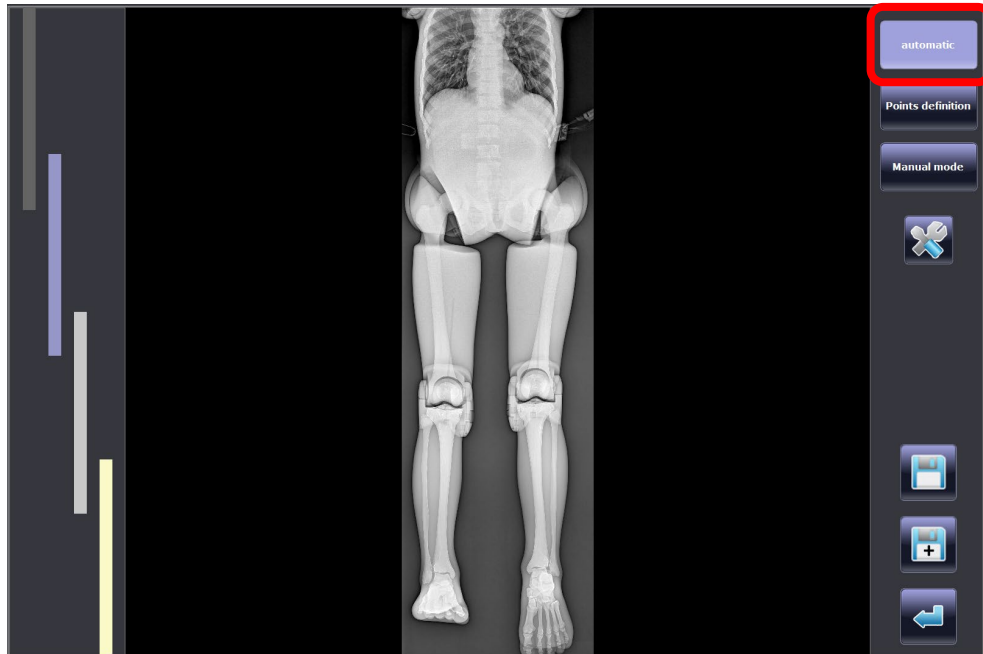
The **Stitching Window** will be opened in **Automatic modality of Reconstruction**.

The stitched image (the result of the stitching procedure) is shown.

1.1.4.1 AUTOMATIC RECONSTRUCTION

The window shows the entire image automatically stitched.

On the left of the image, the overlapping regions are shown using bands of different colors.



To complete the procedure, the user can:

- **Save the stitched image:** in this case the system shows a preview of the stitched image and asks to confirm or cancel the saving.
- **Select a different stitching mode** (the stitched image is built again).
- **Exit** without stitching the images.

Logging in as **Administrator**, it is available a specific **Stitching Post-Processing** menu, to change the settings of the **Stitching Profile** applied.

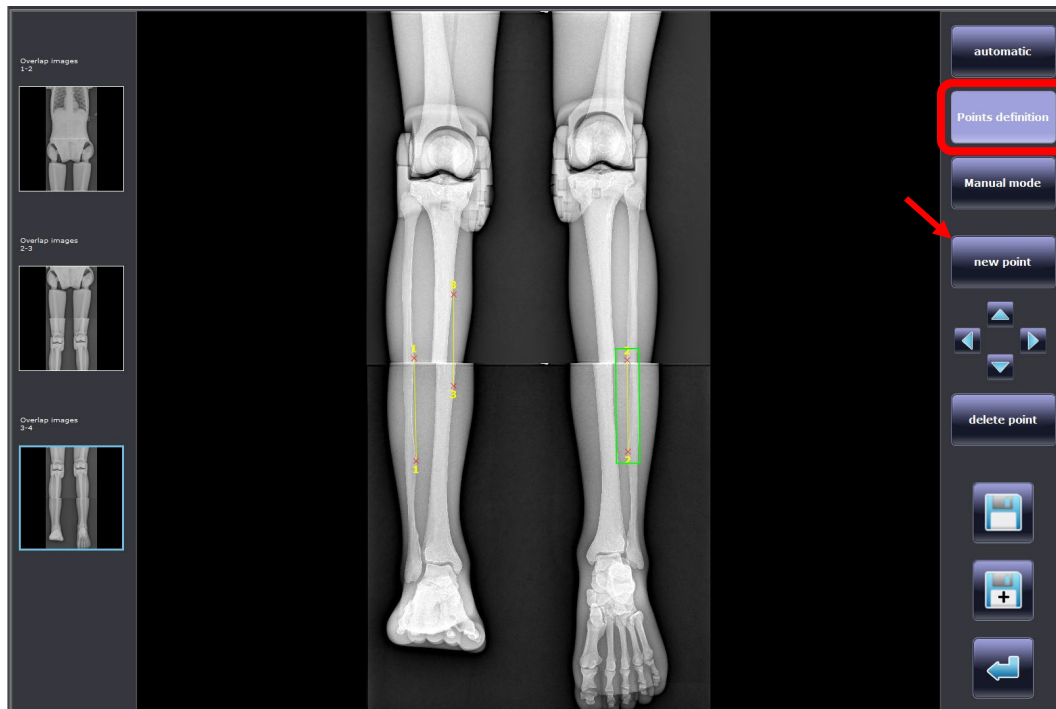
Press the relevant key to open it (for further information about the parameters to be changed, see Paragraph 1.15, Part 1 of the Technical Manual).



1.1.4.2 POINTS DEFINITION RECONSTRUCTION

This modality is based on the identification of a same anatomical point in two consecutive images.

The user selects one of the thumbnails on the left (each one shows the overlapping area between two consecutive images).



To identify the points of reconstruction:

- Press the **New point** button.
- Draw a segment to join the same anatomical detail in the two images and use the **Directional** tips to move the segment.
- It is required to draw at least one segment for each couple of overlap images. The function works at its best when at least 3 points have been placed.
- Use the **Delete** button to eventually remove a segment.

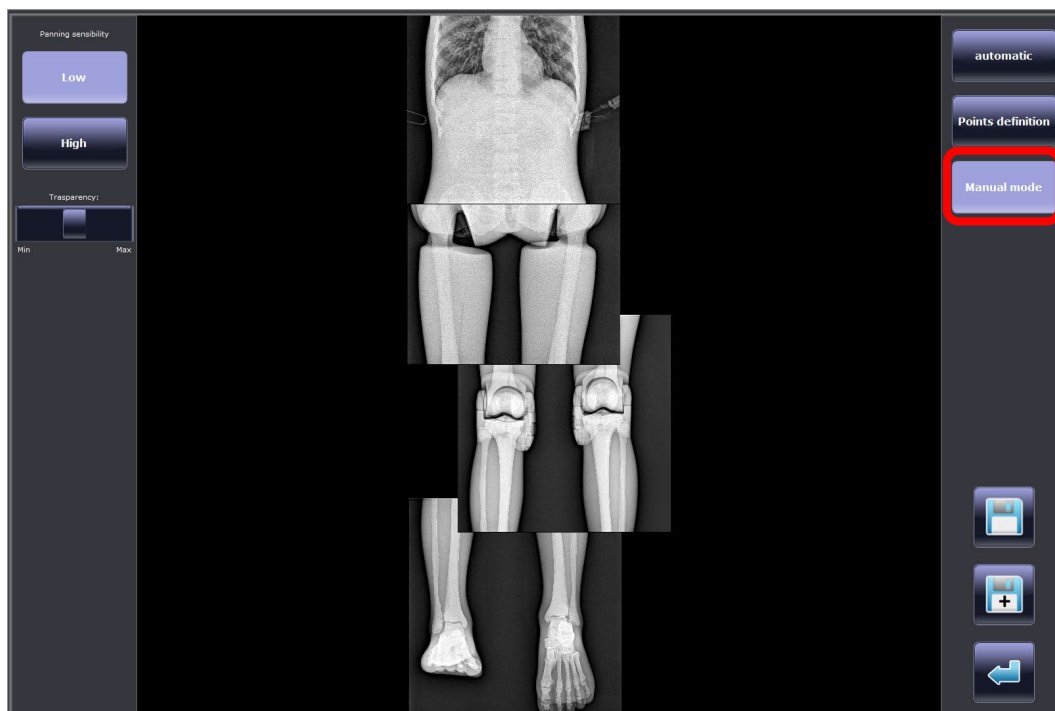
In this modality **Windows** and **Level** values can be adjusted on each single image, one by one, while the **Zoom** factor is changed on the whole image.

To complete the procedure, the user can:

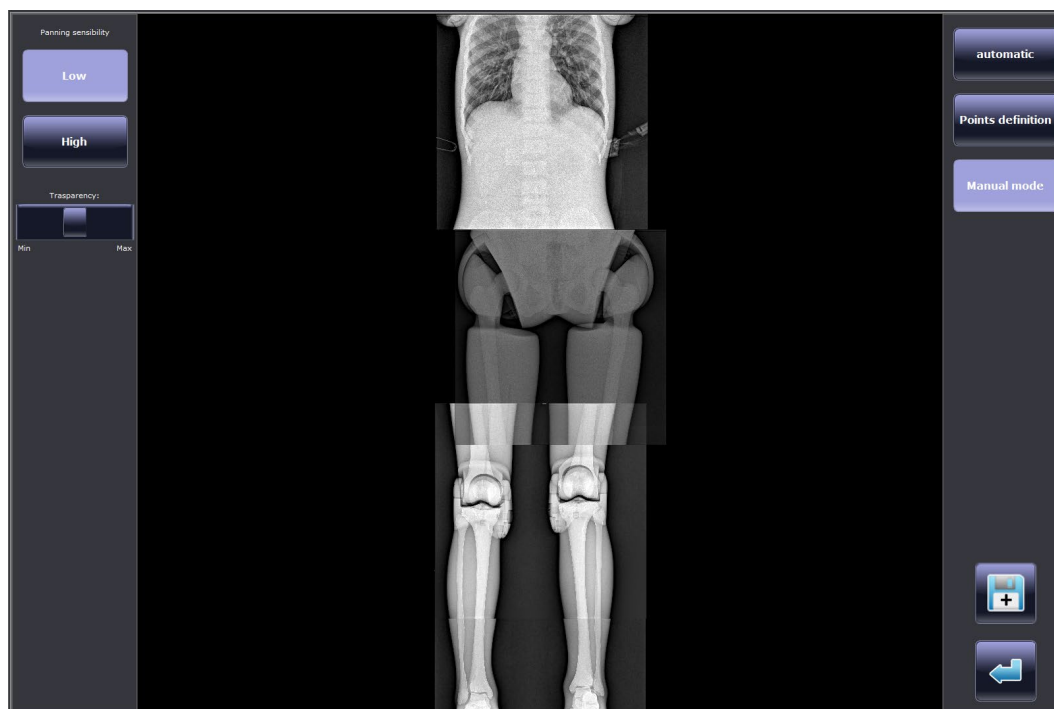
- **Save the stitched image:** in this case the system shows a preview of the stitched image and asks to confirm or cancel the saving.
- **Select a different stitching mode** (the stitched image is built again).
- **Exit** without stitching the images.

1.1.4.3 MANUAL RECONSTRUCTION

Press the **Manual mode** key:



This function shows all the images acquired in the procedure.



The user selects one of the images, and move it respect to the previous / next one (the image is shown with a **transparent default value of 50%**).

On the left, the tool panel makes possible to manage:

- accuracy of the image movement: **Low** or **High**,
- **image transparence** value

For each image, it is possible to adjust the zoom and the W/L value.

To complete the procedure, the user can:

- **Save the stitched image:** in this case the system shows a preview of the stitched image and asks to confirm or cancel the saving.
- **Select a different stitching mode** (the stitched image is built again).
- **Exit** without stitching the images.

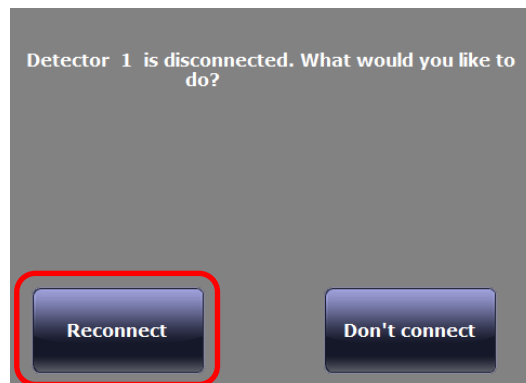
1.2 DETECTOR BATTERY SAVING

To save the charge of the wireless detector battery, it is possible to set intervals after which it turns subsequently in **Sleep** mode, then in **Deep Sleep** mode, and finally in **Power Off** mode.

See Paragraph 1.5.1 in Part 1 of the Technical Manual for details about setup.

Each time the detector status changes, the related message will be shown. The user will be required to reactivate, or not, the detector.

When the detector turns off (once reached the Power Off interval), the detector is disconnected, and the Reconnection window is shown. It is necessary to manually turn the detector on before to select the **Reconnect** key.



1.3 REJECTED IMAGES STATISTICS

Note: this function is available only for **Advanced** and **Administrator** users.

If you need to refer to the statistics on the rejected images, from the **Study List** frame, you can open the relevant menu, pressing the dedicated key:



In the window that opens you can select:

1. Work info:

This frame contains the following information:

- **Operator** that acquired the image
- **Total Images** acquired by the operator
- Total number of **accepted images**
- Total number of **rejected images**

It is possible to filter the search by:

- **Operator** filter, selecting the required user in the dropdown menu, and pressing the **Search** key to find the rejected images acquired by that user.
- **Date** filter, setting the **From** and **To** dates and pressing the **Search** key to find the images within the period (it is required to enable the Date Filter to set dates).

Operator filter **Enable / disable date filter** **Search**

Operator	Total Images	Accepted Images	Rejected Images
	132	122	10
aa	3122	2962	160
Administrator	1066	1010	56
Advanced	1	1	0
Operator	39	39	0
Operatrice	5	5	0

Note: searching filters are applied to all tabs (Work Info, Reject details, Body Part details, and X-ray Book).

2. Reject Details:

Operator	Reject Reason	mA	kV	mS	DAP	Density
Administrator	MOVIMIENTO DEL PACIENTE	0	0	0	0	0
Administrator	MOVIMIENTO DEL PACIENTE	0	0	0	0	0
Administrator	TEST IMAGES	0	0	0	0	0
Administrator	ARTIFACT	0	0	0	0	0
Administrator	MOVIMIENTO DEL PACIENTE	0	0	0	0	0
Administrator	MOVIMIENTO DEL PACIENTE	0	0	0	0	0
Administrator	MOVIMIENTO DEL PACIENTE	0	0	0	0	0
Administrator	POSITIONING	0	0	0	0	0
Administrator	MOVIMIENTO DEL PACIENTE	0	0	0	0	0
Administrator	MOVIMIENTO DEL PACIENTE	0	0	0	0	0
Administrator	POSITIONING	0	0	0	0	0
Administrator	MOVIMIENTO DEL PACIENTE	0	0	0	0	0

This frame contains the following details:

- **Operator** that acquired a specific rejected image
- **Rejection Reason**
- Exposure parameters: **mA, kV, ms, DAP, Density**

3. Body Part Details:

Operator	Body Part	Accept Ratio	Reject Ratio
Administrator	no information	94.61%	5.39%
Administrator	ABDOMEN	100.00%	0.00%
	no information	85.92%	14.08%
Operatrice	no information	100.00%	0.00%
Operator	no information	100.00%	0.00%
Administrator	TSPINE	100.00%	0.00%
	TSPINE	100.00%	0.00%
Administrator	ATLANTOAXIAL	100.00%	0.00%
Advanced	no information	100.00%	0.00%
aa	no information	78.83%	21.17%
Administrator	UNDEFINED	100.00%	0.00%
Operator	UNDEFINED	100.00%	0.00%

This frame contains the following details:

- **Operator** that acquired a specific image
- **Body part** of the rejected image
- **Accept Ratio (%)**
- **Reject Ratio (%)**

4. X-ray Book:

Patient Name	Patient ID	Status	Body Part	View	Date	mA	kV	mS	DAP	Density	Comment	Operator
test offline		ACCEPTED	no information	Cuerpo entero LAT	09-21-2017	0	0	0	0	0		Administrator
test offline		ACCEPTED	no information	Cuerpo entero DV	09-21-2017	0	0	0	0	0		Administrator
test offline		ACCEPTED	no information	Cuerpo entero LAT	09-21-2017	0	0	0	0	0		Administrator
test offline		ACCEPTED	no information	Cuerpo entero DV	09-21-2017	0	0	0	0	0		Administrator
test offline		ACCEPTED	no information	Cuerpo entero LAT	09-21-2017	0	0	0	0	0		Administrator
test offline		ACCEPTED	no information	Cuerpo entero DV	09-21-2017	0	0	0	0	0		Administrator
test collimazione		ACCEPTED	no information	Cuerpo entero LAT	09-22-2017	0	0	0	0	0		Administrator
test collimazione		ACCEPTED	no information	Cuerpo entero LAT	09-22-2017	0	0	0	0	0		Administrator
test collimazione		ACCEPTED	no information	Cuerpo entero DV	09-22-2017	0	0	0	0	0		Administrator
test collimazione		ACCEPTED	no information	Cuerpo entero LAT	09-22-2017	0	0	0	0	0		Administrator
test collimazione		ACCEPTED	no information	Cuerpo entero DV	09-22-2017	0	0	0	0	0		Administrator
test collimazione		ACCEPTED	no information	Cuerpo entero LAT	09-22-2017	0	0	0	0	0		Administrator

This frame contains the following information:

- **Patient Name**
- **Patient ID**
- **Image Status** (Accepted or Rejected)
- **View**
- **Date**
- Exposure parameters: **mA, kV, mS, DAP, Density**
- **Operator** that acquires the image

In this tab, it is possible to filter the search also by the **Patient ID** or by **Body**.

If you need to export the **Statistics of rejection**, select the required study (or image) statistics and press the **Export** key; the following window appears:

Device: D:\rejected_images_export\

Volume ID: REJECT_STATISTICS

Total export file size: <1 MB

Available space on the target device: 19360 MB

Format: XLSX HTML

Status:

Export Abort Erase disk

Here you can export the statistics to an external memory device, selecting it from the **Device** dropdown menu.

Otherwise, it is possible to save the statistics on the equipment HD, selecting the folder of destination. In both cases, statistics can be exported either in Excel or HTML format.

1.4 CLOSING THE STUDY

After you accomplished the study, you can:

- **Suspend** the study, with the relevant button:
As long as the study is in the Suspended status, it is possible to add new exams (thus acquiring new images), reject or retake images already acquired.
- **Complete** the study, touching the relevant button:
This command closes the study, considering it completed, and no new images can be acquired.



Accordingly, the study status is changed in the Study List:

Study list (1 - 18 / 95)									
		Patient	Patient ID	Sex	Date of birth	Description	Date of study	Accession number	
		Smith John		M			02-12-2018 15:44		
		Smith Jack		M			02-09-2018 12:51		
		VOLTA ALESSANDRO	PAT001008	M	01-15-1945	• Pr. COMPLETE SKUKLL St. COMPLETE SKUKLL	02-09-2018 11:43	999888777777	
		EMERGENCY	180209-113639				02-09-2018 11:36		

- Suspended study:



- Completed study:



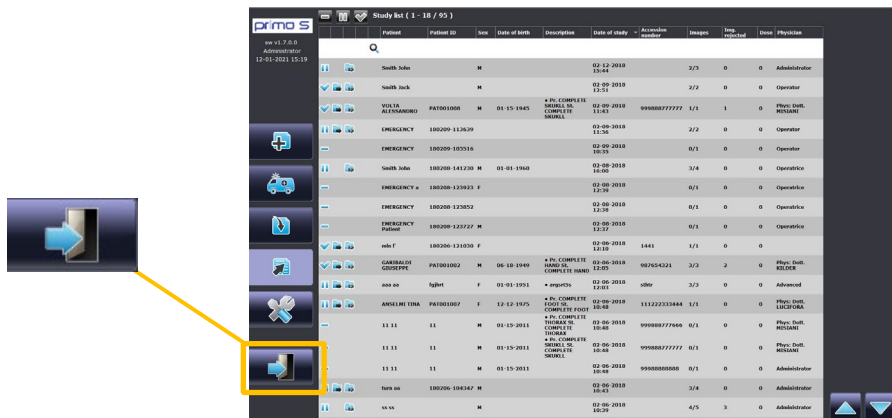
It always possible to use the post-processing functions on already acquired images: see Chapter 2 in Part 2 of this Manual.

Note: The image disk (hard disk) in the equipment must not be considered a permanent archive: it is recommended to transfer all the images to an external archive (e.g. using the STORE DICOM function) before closing the application and switching the system off.

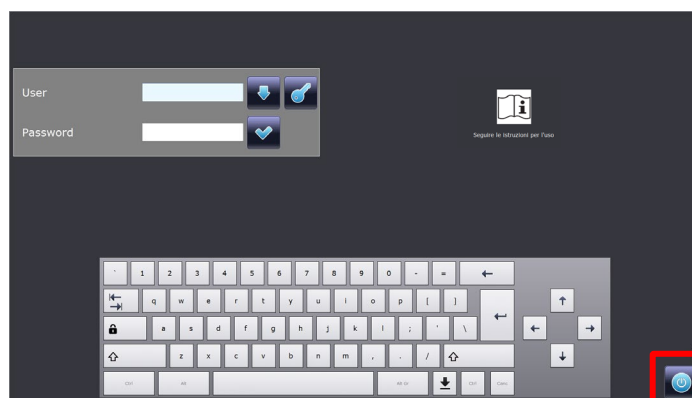
1.5 END OF USE

To close the application and switch off the system:

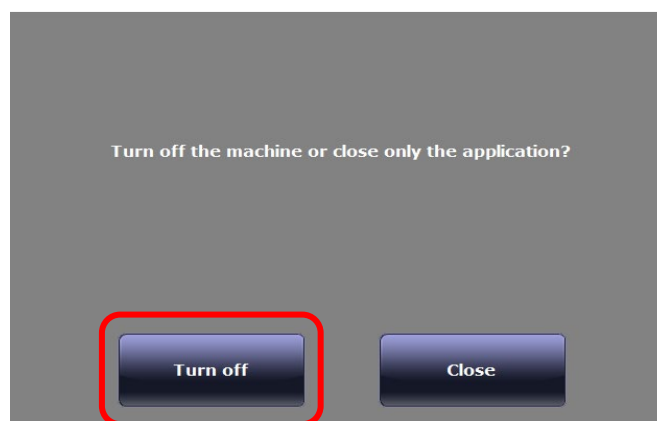
Touch the **Exit** command in the Study List and **Confirm** the exit:



Press the **Shutdown** icon in the Login page:



Now press **Turn off** in the window that appears:



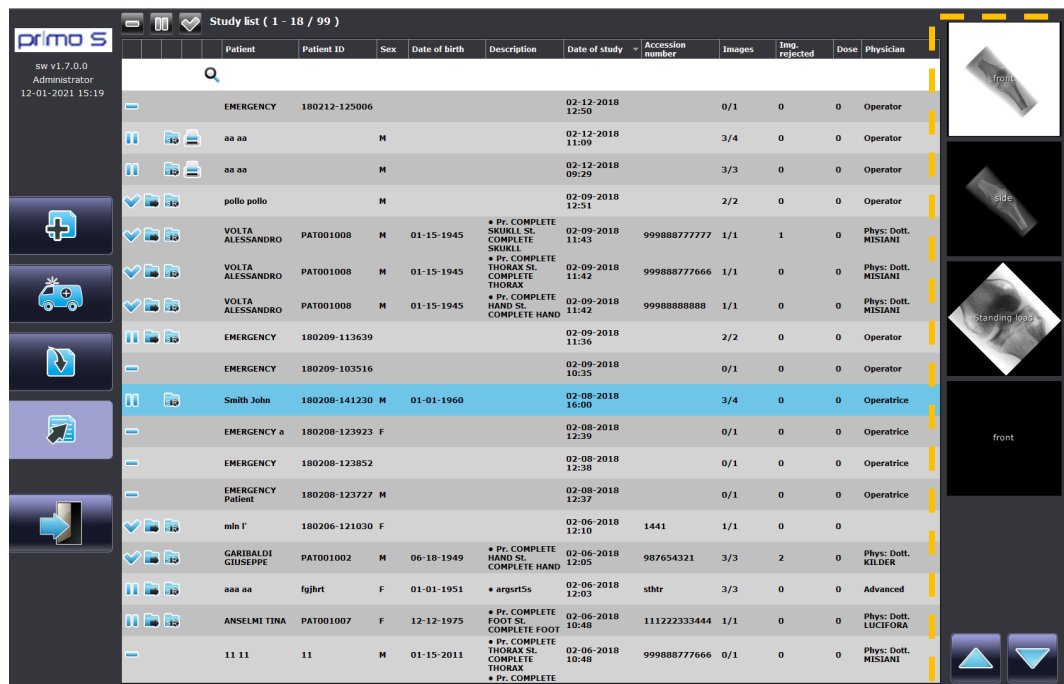
Note: The **Close** key, shuts the **primo S**, but does not switch the video processor off.
Use this command **for servicing purpose only**.

2 IMAGE PROCESSING

2.1 IMAGE MANAGEMENT

2.1.1 FINDING IMAGES

After selecting (tap once) a study in the **Study List**, a preview of the images present in that study is shown:



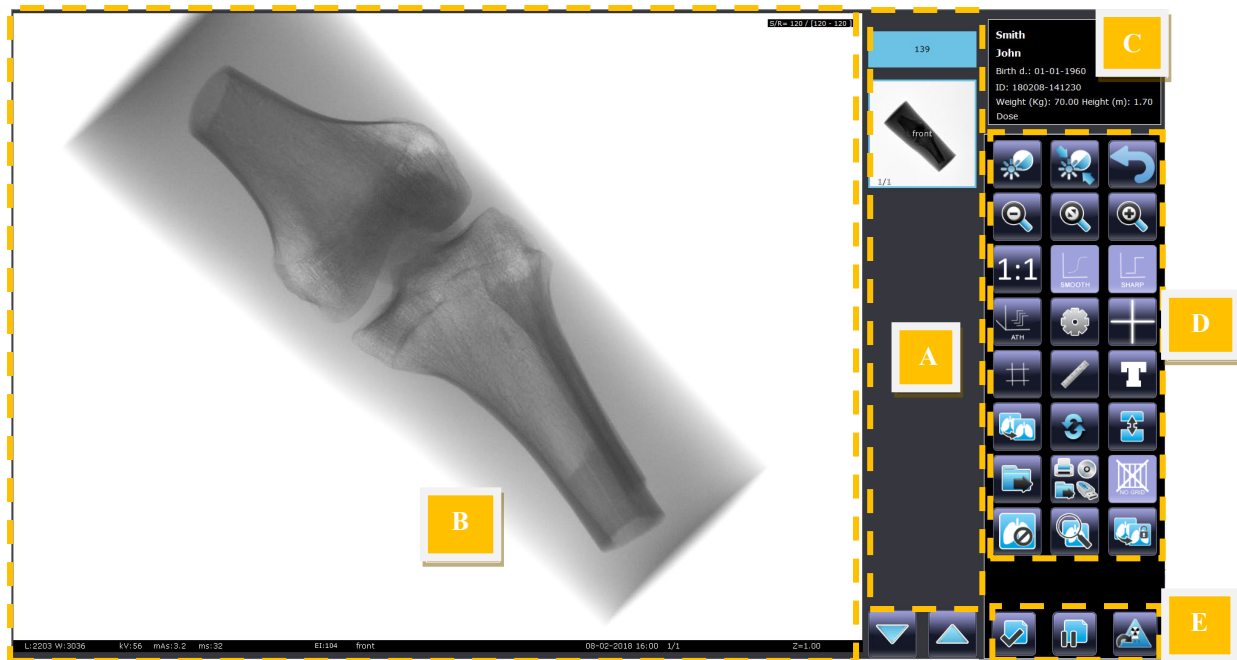
If there are more than 5 images in the study, use the up/down tips to browse within the images list.

To process an image, tap on its preview twice and the **Image Processing Frame** will open.

2.1.2 IMAGE PROCESSING FRAME

The Image Processing frame is split into the following sections:

- A. **Previews / Exams List**
- B. **Image area**
- C. **Patient data**
- D. **Image Processing commands**
- E. **Study commands**



A) Previews: This area contains the images acquired during the study in preview (thumbnail) mode and a black box for each exam to be carried out.

B) Image area: The image you select in the Preview area is shown here with its own data. The data are split into groups, as shown in the figure and table below:

L:2873 W:255 kV:55 mAs:25.0 ms:40 mGy_cm²:0.0 Elt:500 EI:603 DI:0.81 Cráneo AP 14-07-2021 11:06 6/6 Z=0.48

Information	Example	Notes / Meaning
Grey scale	L: 2873	Image Level value
	W: 255	Image Window value
Exposure Values	kV 55 mAs 25 ms 40	
Exposure index Target	EIt: 500	Target dose set for the image (in Exam setup)
Exposure index	EI: 603	Exposure index detected in the acquired image
Deviation Index	DI: 0,81	Indicator of the difference between expected (EIT) and achieved Exposure index (EI)
Exam Projection	Head AP	Exam type used for image acquisition
Acquisition date - time	14-07-2021 11:06	Automatically added by the system
Image number	6/6	6 th of 6 image contained in the study
Digital zoom	Z = 0.48	Image enlargement factor on the monitor
Stitching procedure Image		The image belongs to a Stitching Procedure
Stitched Image		The image is the result of the Stitching function

C) Patient data: This section shows the patient personal data:

- Patient's name (or Emergency number if you are using the emergency mode),
- Birth date,
- Patient ID,
- Weight (Kg) and Height (m)
- Total Dose

D) Image Processing commands:



E) Study commands:



Complete study: this command closes the study, considering it completed, and no new images can be acquired.



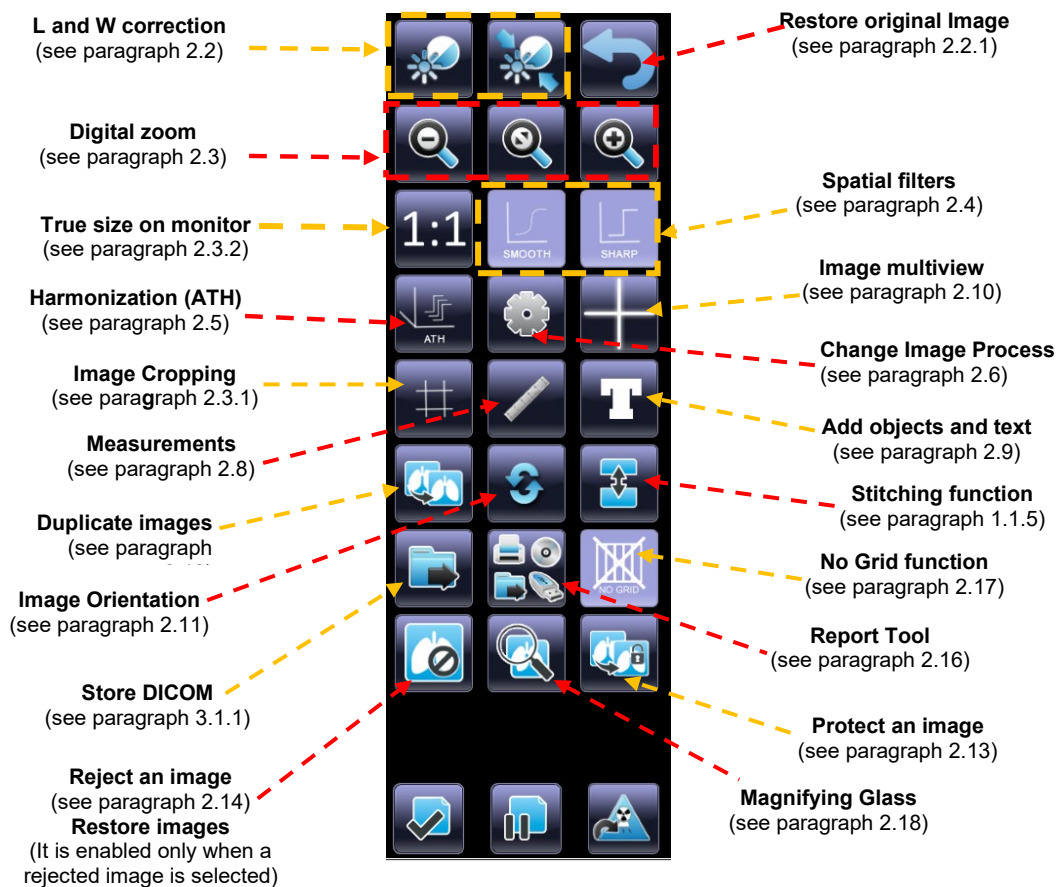
Suspend the study: As long as the study is in the Suspended status, it is possible to add new exams (thus acquiring new images), reject or retake images already acquired.



Return to working frame: Press this key if you need to acquire further images within this study.



The **post-processing panel** presents the following keys:

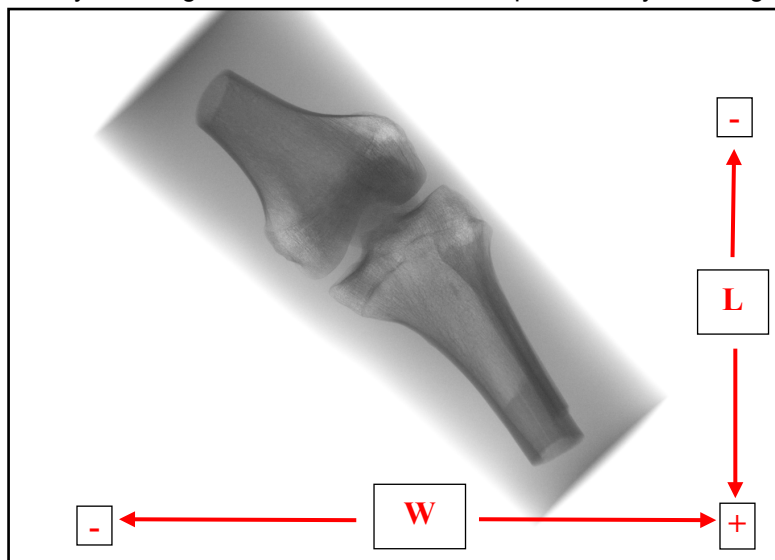


Note: *Stitching features are NOT available on Mobile and Portable units.*

2.2 LEVEL AND WINDOW CORRECTION

You can change the appearance of an image in terms of its brightness and contrast by changing the **W** (Window) and **L** (Level) parameters.

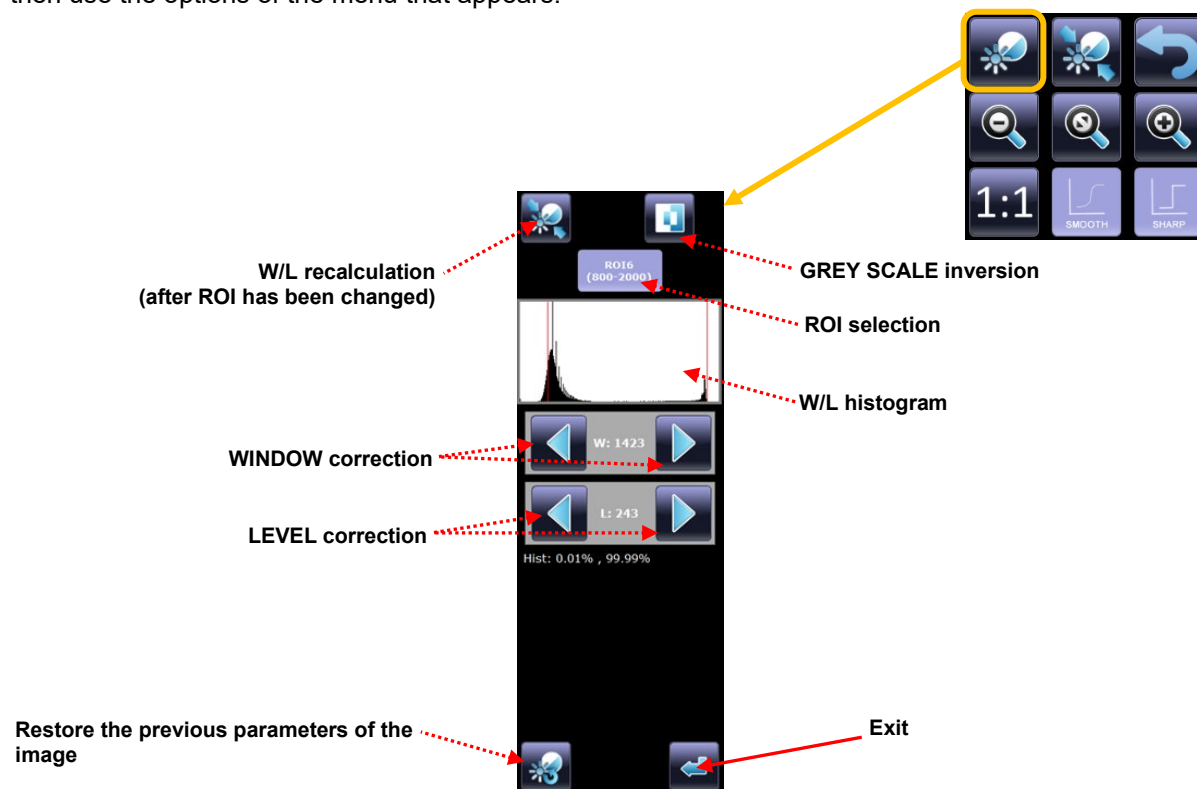
- It is possible to change the **W** and **L** values, by swiping your finger along the image edges, as shown in figure below (both in the post-processing panel and in the acquisition one).
Swipe horizontally to change the **Window** value or swipe vertically to change the **Level** one.



If the equipment is provided with a mouse, by pressing:

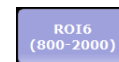
- the **Left** key it is possible to pan the image, grabbing it by its center or to change the W/L values (as shown above);
- the **Right** key it is possible to change the W/L values in every point of the image.

You can even open the **W/L correction** frame to apply more functions. Press the relevant key and then use the options of the menu that appears:



This menu lets you:

- Select the ROI to apply to the image. It can have 8 dimensions (choose the one that better cover the important area of your image):
 - **ROI 1:** 640x768 pixels
 - **ROI 2:** 1120x1344 pixels
 - **ROI 3:** 1600x1920 pixels
 - **ROI 4:** 2080x2496 pixels
 - **ROI 5:** 2750x2800 pixels
 - **ROI 6:** 800x2000 pixels
 - **ROI 7:** 2000x800 pixels
 - **ROI 8:** 1500x2800 pixels



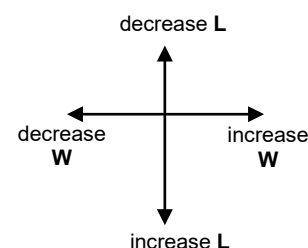
1. Pressing the key; W and L values will be recalculated automatically.



2. Reverse the grey scale.



3. Adjust the Window and Level values, manually, using the dedicated tips or directly on the image by swiping your finger on a side of the image.



- Use the relevant command to return to **W and L values** the image had before you opened this menu.

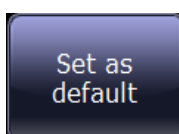


- Press **Exit** to quit the menu, thus returning to the Image Processing menu.

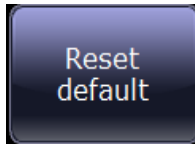


The functions described below are available for **Administrator** and **Advanced** users, only.

- Once you find optimal W and L values, you can decide to:



- Set the parameters currently used to calculate W/L values as Default parameters, for this type of exam. Every time you will use this type of exam, the images will be shown up with these settings.



- It is possible to reset the Default parameters of calculation, pressing the relevant key.



- This function allows to change some of the image postprocessing parameters (**ROI, W/L calculation parameters, image positive or negative**) applied to the image at its acquisition.
- To make these changes effective, press the **Save Processing Changes** key (aside).
From now on, the image acquired using this type of projection, will be shown up with your new set of parameters.

- Touch **Exit** to quit the menu, thus returning to the Image Processing menu.

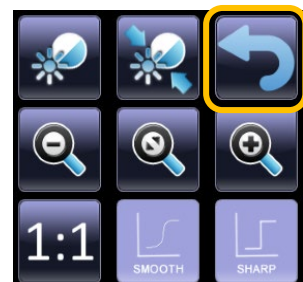


2.2.1 RESTORE TO ORIGINAL VALUES

In the Post processing menu, it is possible to change some of the Image Process parameters applied when an image is acquired, according to user's privileges.

This function allows to restore the original Image Process parameters (W/L, ROI, zoom and rotation factor, spatial filter, ATH and LUT curve applied, etc.).

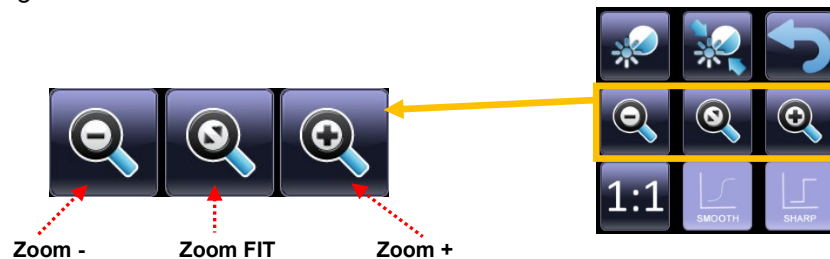
Press the relevant key to restore the image to original IP parameters.



2.3 DIGITAL ZOOM FUNCTIONS

Usually, the whole image acquired by the detector is shown on the monitor (minimum zoom level). It is possible to increase the zoom level up to reproduce one detector pixel on two monitor pixels (max zoom level, $Z = 2.0$).

The zoom commands to change the zoom level are:



Zoom + : increases the **Zoom value**.

Zoom FIT : to adapt the image to the display window (or restore the initial zoom value).

Zoom - : decreases the **Zoom value**.

As the image has been enlarged, it is possible to pan it to centre the specific area of interest.



The zoom factor **Z** is shown in the image footer.

$Z=1.00$ corresponds to the **True Size** zoom, that means the object in the image is shown on monitor at its real size.

Note: For each exam, it is possible to enable or disable the **Fit to Screen** function.

When **enabled**, the image will be presented with the zoom factor required to show the whole image on the monitor.

When **disabled**, the image will be presented with the max zoom factor.

(It is possible to enable or disable the function in the **Exam Setup** menu; see Paragraph 1.6.2 in Part 1 of the Technical Manual for further details).

2.3.1 DIGITAL COLLIMATION OF THE IMAGE

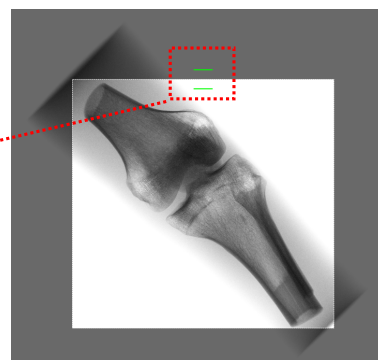
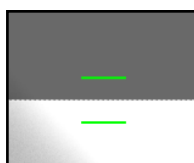
The **Digital Collimation (Crop)** function is available to cover the not interesting parts of an image.



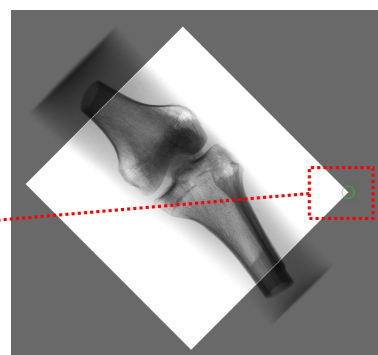
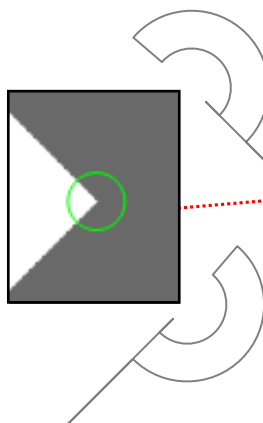
To use this function, press the dedicated key and, from a point of the image, draw the diagonal of the rectangle that contains the part of interest.

Selecting one of the collimation sides, it is possible to:

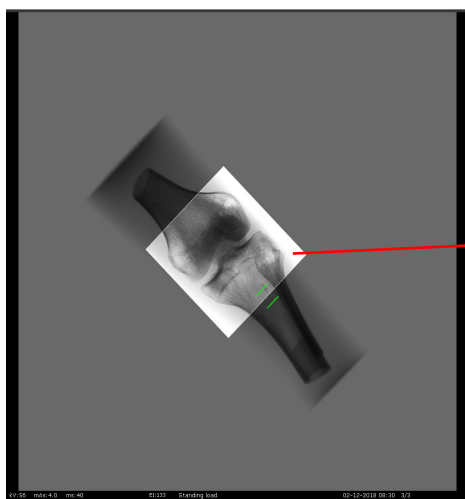
- Drag each one of its sides.



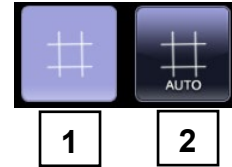
- Rotate it by dragging one of its corners.



- To confirm, press again the dedicated key: the cropped part is magnified to the highest zoom factor possible.



The exam can be set to acquire using the **Auto Collimation** function (enabled in the **Exam Setup** menu).
The function recognizes if the image was acquired by partially closing the physical collimator.



When enabled, only the part of the image within the collimated area will be displayed.

To view the entire image, click on the **Digital Collimation key (1)**: it is then possible to modify the virtual collimation area, if necessary.

Next to **(1)** key, the **Automatic Collimation button (2)** will be shown: pressing it will restore the collimation area to the acquisition size.

2.3.2 TRUE SIZE ON MONITOR

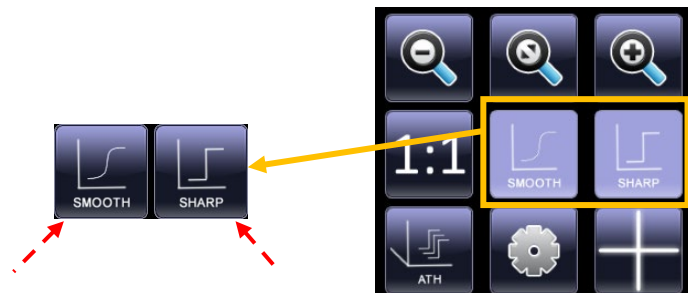
True size on monitor function shows the image on the monitor at its real size, pressing the key.



Note: it is possible to directly show an image in True Size at the acquisition: see paragraph 1.6.2 in Part 1 of the Technical Manual for further details.

2.4 SPATIAL FILTERS

You can apply different types of spatial filters (smooth or sharp).



- **SMOOTH filter:** it softens the edges of the image
- **SHARP filter:** it enhances the edges of the image

For **Administrator** and **Advanced** users, it is possible to change **Kernel** and **Weight** filter values.

Pressing one of the filter keys, the following panel is shown.



Administrator and **Advanced** users can make these changes permanent, by pressing the **Save Processing Changes** key.
From now on, all images acquired with this exam, will be shown up with the new settings.



2.5 ANATOMICAL TISSUE HARMONIZATION (ATH)

Harmonization algorithms (**Anatomical Tissue Harmonization**) are used to improve the displayed image quality thanks to different algorithms.

These algorithms are associated with the exam, mainly based on the anatomical part under examination.

In post processing, you can adjust the parameters of the algorithm applied to the image, by opening the ATH menu:



Specifically, the parameters are:

- **Contrast:** increasing the factor, the image contrast is enhanced.
- **Edge:** for values from 0,6 to 1: contours get reduced.
for values from 1 to 5: contours are enhanced.
- **Latitude:** for values from 0,6 to 1: latitude is magnified.
for values from 1 to 5: latitude is reduced.

Set the needed value of the parameters by moving the cursor along the bar: changes are immediately applied on the image.

If required, it is possible restore the default values pressing the relevant key.



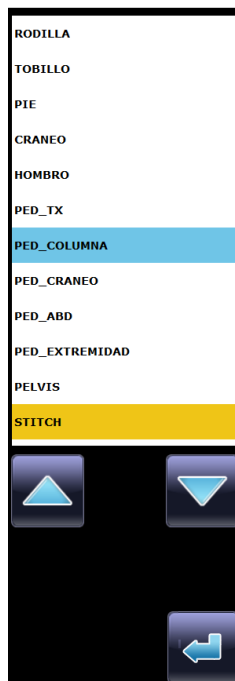
To return to post-processing menu, press the **Close** key.



2.6 CHANGE IMAGE PROCESS

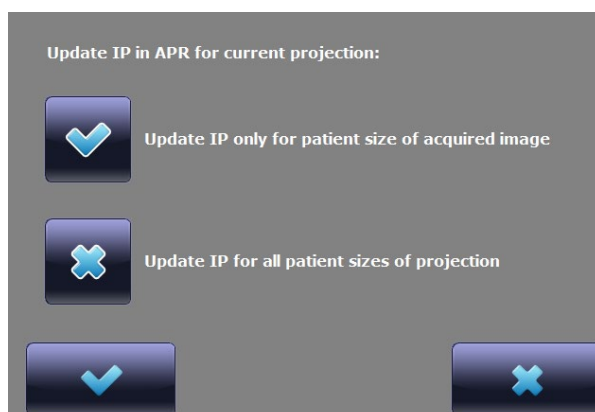
This menu allows to change the process type automatically applied to the image (according to the exam).

By pressing the relevant key, the following menu is opened.



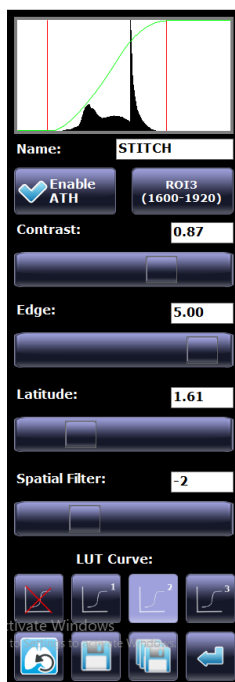
- The process already applied to the current image is highlighted in yellow.
- Select from the list a new process: this gets highlighted in light-blue, and it is immediately applied. Previous process is still highlighted in yellow, to make easier the return to default process.

For Administrator and Advanced users only, it is possible to save the new process as the default one set for the exam (in Exam Setup), pressing the relevant key. It is possible to apply the new process to the current patient size or to all sizes available.



Once you press **Confirm** key, the new default process gets highlighted in yellow.

For Administrator and Advanced users only, it is possible to adjust some parameters of the default process applied, pressing the relevant key.



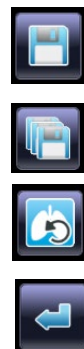
PARAMETER	DESCRIPTION	RANGE	NOTES
Image Processing Name	Enter the name to label a new image process.		
Enable ATH	Enable / disable the application of the ATH to the image.		
ROI type	To select the calculation ROI for the Auto LUT function.	- ROI 1: dim. 640x768 pixels - ROI 2: dim. 1120x1344 pixels - ROI 3: dim. 1600x1920 pixels - ROI 4: dim. 2080x2496 pixels - ROI 5: dim. 2750x2800 pixels - ROI 6: dim. 800x2000 pixels - ROI 7: dim. 2000x800 pixels - ROI 8: dim. 1500x2800 pixels - AUTO COLLIMATOR	Auto collimator: the ROI is the X-ray collimated area
Contrast	Contrast variation factor.	0,5 – 1 (0,5 = max variation) (1 = no variation)	
Edge	Edge variation factor. If the value is less than 1, the contours are reduced proportionally. If the value is more than 1, the contours are enhanced proportionally.	0,6 – 5 (0,6 – 1 = edge reduction) (1 - 5 = edge enhancement)	Excessive increase can lead to increased image noise or artifacts.
Latitude	Latitude variation factor. If the value is less than 1, the image latitude is magnified. If the value is more than 1, the image latitude is reduced.	0,6 – 5 (0,6 – 1 = latitude increase) (1 - 5 = latitude reduction)	
Spatial Filter	To select the spatial filter applied.	-4 = Smooth > Kernel:5x5 Weight:3 -3 = Smooth > Kernel:3x3 Weight:3 -2 = Smooth > Kernel:3x3 Weight:2 -1 = Smooth > Kernel:3x3 Weight:1 0 = Disabled;	

PARAMETER	DESCRIPTION	RANGE	NOTES
		1 = <i>Sharp</i> > Kernel:5x5 Weight:1 2 = <i>Sharp</i> > Kernel:5x5 Weight:2 3 = <i>Sharp</i> > Kernel:5x5 Weight:3 4 = <i>Sharp</i> > Kernel:7x7 Weight:2	
LUT Curve	To select the LUT curve used to be applied on the image.	Options: - NONE : no curve - LUT 1 - LUT 2 - LUT 3	

The image is **immediately** recalculated with the new parameters.

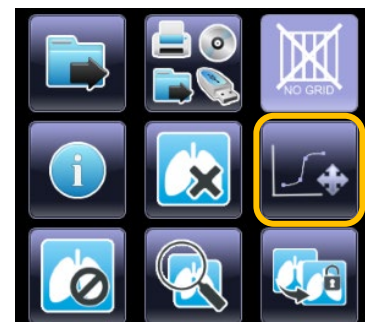
Now, it is possible to:

- **Save changes** to the process in use, by pressing the related key.
- **Create a new image process profile**, by pressing the related key.
- **Reset default parameters**, by pressing the related key.
- **Close image process menu**, by pressing the related key.



2.7 LUT CURVES

The **Administrator** and **Advanced** users have the possibility to change even the **LUT curve** applied to the image. The relevant key opens the selection menu:



- It is possible to choose different parameters to apply: **LUT1**, **LUT2**, **LUT3**, **NO LUT**.
- If required, select the correct LUT curve and press the **Save Processing Changes** key: this way the LUT curve associated to current image process is updated.



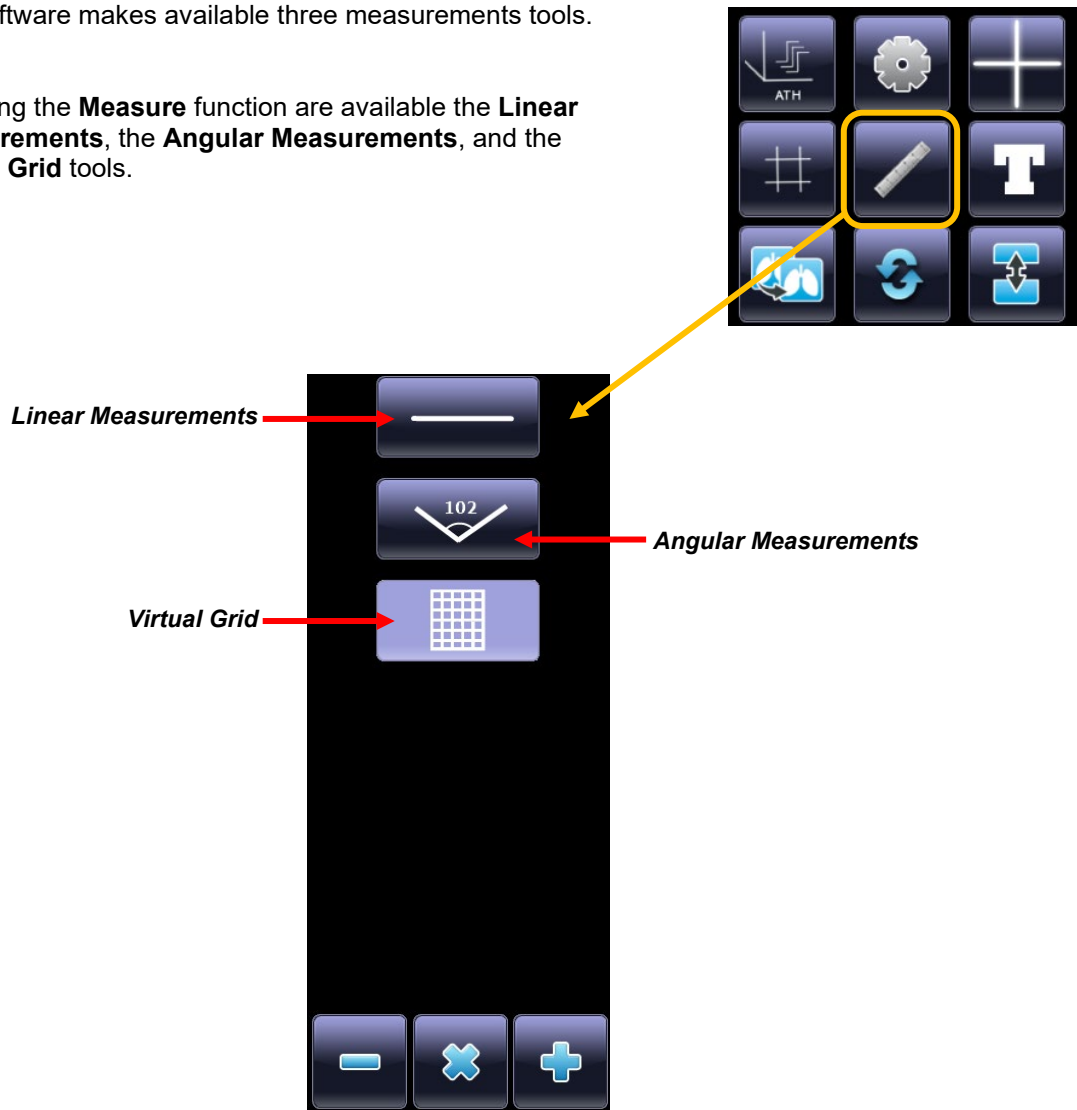
Touch **Exit** to quit the menu, thus returning to the Image Processing menu.



2.8 MEASUREMENTS

The software makes available three measurements tools.

Selecting the **Measure** function are available the **Linear Measurements**, the **Angular Measurements**, and the **Virtual Grid** tools.



Note: these measurements are not affected by zoom factors or any rotation of the image, whether applied beforehand or afterwards.

2.8.1 CALIBRATION AND LINEAR MEASUREMENTS

The **Distance** function lets you measure linear segments in the image.

To measure a segment, press the relevant button and then:

- Use your finger or mouse to draw a segment between the two points you want to measure the distance of. A line automatically appears, with the distance expressed in mm.
- Correct the position by moving:
 1. the ends of the segment: click on one of its ends and then drag it to the required position or use the 4-directions tips.
 2. the entire segment: click on a central part of the line and then drag it to the required position or use the 4 direction keys.

Note: The direction keys move the object of 1-pixel steps.

Now, you can:

- decrease or increase the font size of the measurement:
- delete the segment using the relevant key:

Press **Exit** to save the measurements and quit the function.

To make measurements the most accurate, it is suggested to use the calibration function, if possible.

It is required a known-length object within the image:

- Press the **Linear measurement** button
- Draw a line over the known-length object, using your finger or mouse.
- Enter the known length of the calibration object (in mm) in the relevant field and then touch the **Measure Set** button.
- *All the measurements on the image will be recalculated, depending on the calibration.*



Note: the maximum error without calibration is 3%, with the object placed on the FPD surface.

2.8.2 ANGULAR MEASUREMENT

This function lets you measure angles in the image. After selecting this function:

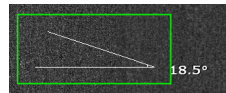


- Draw the 1st edge, then the vertex and then the 2nd edge on the image. The angle is automatically drawn, and its value is shown.



Note: The value always refers to the smaller angle (i.e., less than 180°).

- Correct the position by moving:
 1. edges or vertex of the angle: touch one of these and then drag it to the required position or use the 4 direction keys.
 2. the entire angle: touch a central part of one edge and then drag it or use the 4 direction keys.



Note: The direction keys move the object of 1-pixel steps.

Now, you can:

- decrease or increase the font size of the measurement:
- delete the angle:



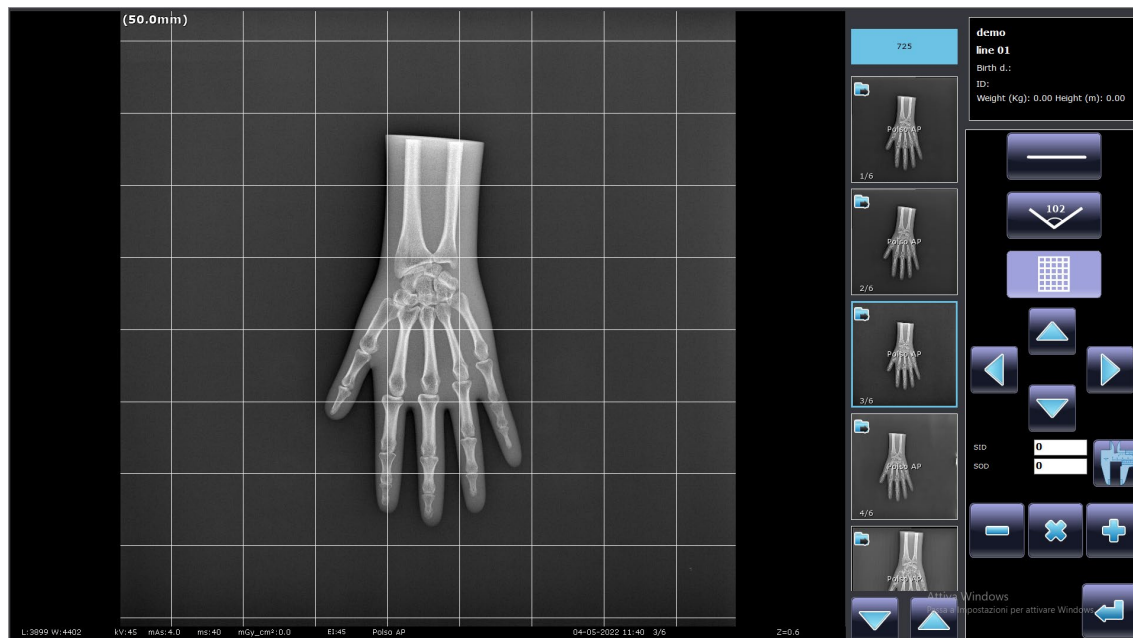
Press **Exit** to save the measurements and quit the function.



2.8.3 VIRTUAL GRID

The **Virtual Grid** function overlays a grid on the image, to be used to measure anatomical parts.

By default, the reticule size is **50 mm** (the grid is calculated on **SID** and **SOD** values set in **Exam Setup**: see *Paragraph 1.6.2, Part 1 of the Technical Manual*).



It is possible to:

- drag the grid over the image,
- increase or decrease the reticule size (the value is shown on the top left corner of the image),
- delete the grid using the relevant key.

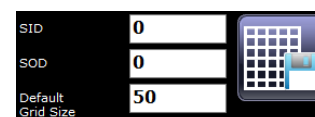


To make the grid representation the most accurate, it is suggested to use the calibration function, if SID and SOD values are different respect those set in Exam Setup.

Attention: it is required to know the SID (Source Image Distance) and SOD (Source Object Distance) of the acquired image.

- Enter the values in the related fields.
- Press the **Calibrate** key: the reticule value will be changed as well.

With **Administrator privileges only**, they are available a field to change the **Default Grid Size** value and a key to update the SID and SOD values set in the Exam Setup, directly from this menu.



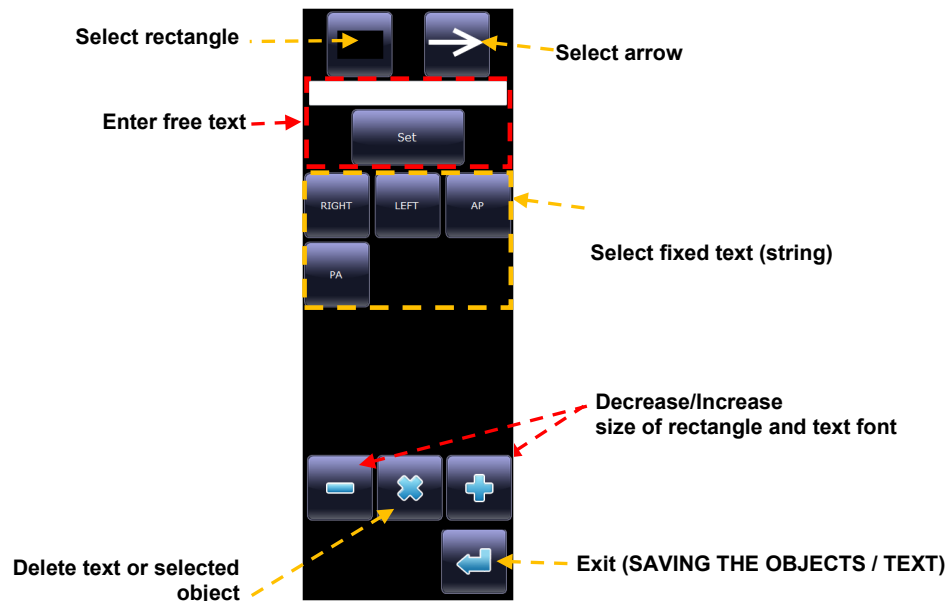
Press **Exit** to quit the function.



2.9 ADDING OBJECTS AND TEXT

It is possible to add graphic objects and texts to the image.

Press the relevant key, in the post-processing menu, to use the following functions.



2.9.1 RECTANGLE

The object covers parts of the image to be hidden. Press the relevant button to enable this function.



- Draw a diagonal line (which represents the diagonal of your rectangle) over the part of the image you wish to hide. A black rectangle is automatically drawn.



- By clicking the rectangle, it is possible to:

- drag and drop it using your finger or mouse;
- increase/decrease its size,
- increase/decrease only one of its sides, drag the relevant one to the required position.
- delete it.

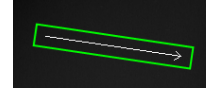


2.9.2 ARROW

This function allows to draw an arrow on the image. Press the relevant button to enable the function.



- Draw a line on the image to create an arrow (the end of this line will be its pointed side).
- Touch the arrow to:
 - drag and drop it using your finger or mouse;
 - move its extremities: press one of its ends and then drag it to the required position.
 - delete it.



2.9.3 ENTERING A TEXT

This function allows to add comments over the image.

The equipment has some default strings you can use (to be set in **Fixed String setup**, see *Paragraph 1.12 in part 1 of the Technical Manual*).

- After selecting the string, select the point on the image where you want to add it.
- Alternatively, enter a free text:
 - type the text in the indicated field;
 - touch the position on the image where you want to add it.



- By clicking on the text, it is possible to:
 - drag and drop it,
 - increase/decrease its size,
 - delete it.



Touch **Exit** to save the changes and quit the function.



2.10 IMAGE MULTIVIEW

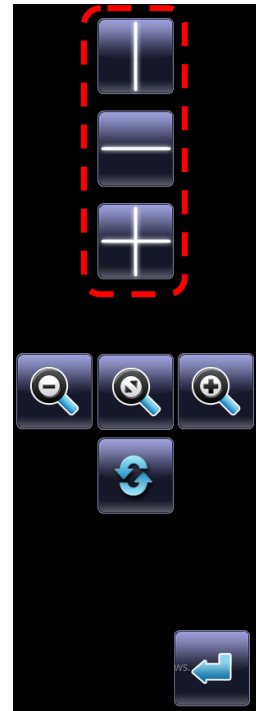
Press the relevant key to enable the simultaneous view of more images.



- It is possible to choose between three different views:

- Two images on vertical screen split;
- Two images on horizontal screen split;
- Four images.

Drag and drop the selected image from the preview list into one of the boxes.



After selecting the images, it is possible to:

- To change the **zoom level** of a selected image. Press the central **Magnifier** key to bring back the selected image to its initial zoom factor. If no images are selected, when you press the zoom keys, all the images will change as a result.



- To change the **orientation** of the selected image (*see paragraph 2.11 below*).

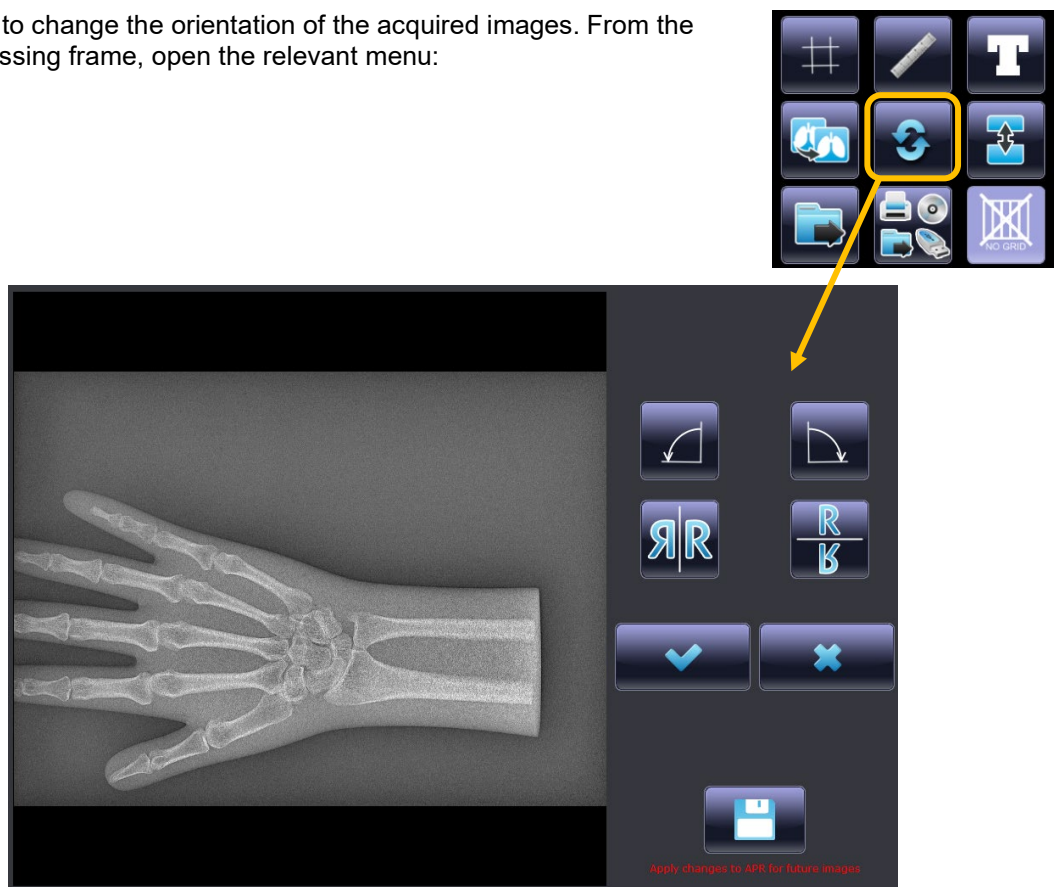


- Press the **Exit** key to quit the function, thus returning to the Image Processing menu.



2.11 IMAGE ORIENTATION

It is possible to change the orientation of the acquired images. From the Image Processing frame, open the relevant menu:



- Rotate the image clockwise  or anti-clockwise  by 90 degrees.
- invert the image with respect to the vertical  or horizontal  axis.
- By grabbing the image by one of its corners, it is possible to freely rotate it.
- Pressing the **Save Rotation Changes** key, all images acquired using this exam, will be shown up with the new orientation.



- Confirm or delete changes.

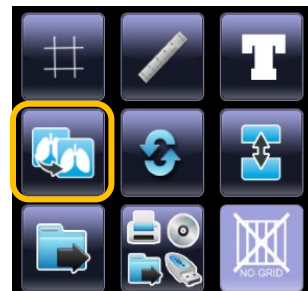


2.12 DUPLICATE AN IMAGE

By pressing the indicated key, a copy of the current image is created. Usually, to the copy-image are applied post-process operations different from the original one.

In the preview list, it is marked with the text "COPY".

It is not possible to create more than three copies of an image.



2.13 PROTECT AN IMAGE

To avoid an image to be altered by other users, it is possible to **create a locked copy**. Press the relevant button and a copy will be created; it is identified by the text "**Locked Copy**".

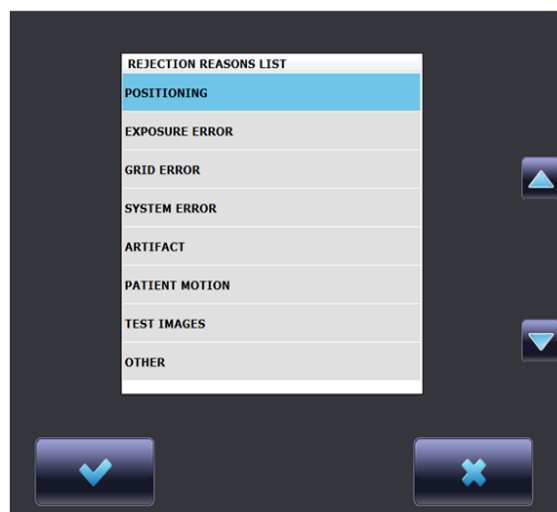
No one should alter the locked copy, unless the user who created it decides to unlock the copy, pressing the same key.



2.14 REJECT / RESTORE AN IMAGE

If an image quality is found to not be fulfilling, it cannot be deleted, but must be identified as **rejected**.

Every user (**Operator**, **Advanced** or **Administrator**) can **Reject** a single image in the study. To reject an image, use the relevant key and a window appears:



Select the rejection reason from the list.

If you need to take back a rejected image, you will use the **Restore** button.



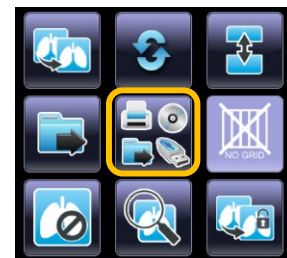
2.15 DELETE AN IMAGE

Only the **Administrator** can **Delete** a single image within the study or a whole study. The Administrator can delete a **Locked Copy**, too.



2.16 REPORT TOOL

Once completed the post-processing operations, it is possible to save the needed images within the study on a memory device, store or print them.



Note: the same key is found in the Study List frame, too.

Press the relevant key to open the Report tools menu. It opens the following window:

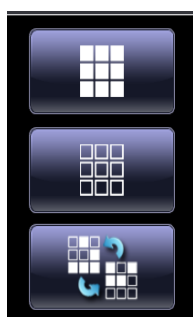


All the images in the study are now shown in this grid. If the study has more than 9 images, you can browse within the images with the dedicated tip buttons. (They appear, aside the images previews, only when more than 9 images are present).



Note: in case of a multi-study patient, the images will be presented in frames of different colors, depending on the study they belong to.

Select manually the images required; otherwise, with the relevant keys:



Select all the images in the study

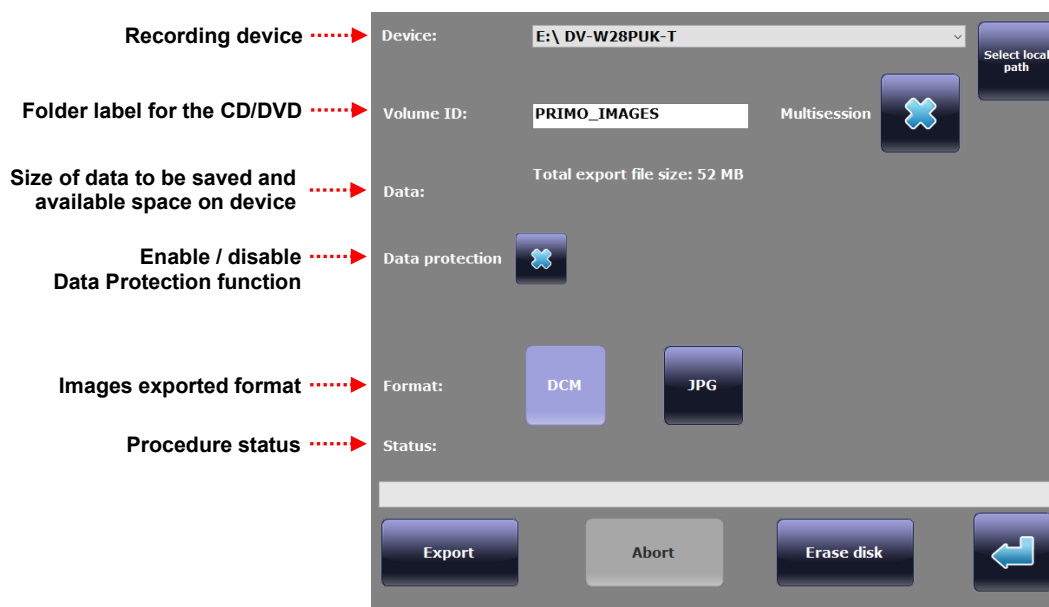
Deselect all the images in the study

Reverse the selection (all the selected images get unselected and vice

2.16.1 SAVING IMAGES

Once you select the needed images, you can:

- Send them to the default DICOM store (left key) or select between the DICOM stores present in the list (right key). The same key is also present in the post-processing frame.
- Export the selected images on a memory device (CD or USB pen drive); *this function is enabled for **Advanced** and **Administrator** users, only.* When you press it, the following window appears on the monitor:



Press the **Export** key to complete the procedure (or the **Go Back** key to cancel and quit the panel).

2.16.1.1 DATA PROTECTION

The **Data Protection** function allows to export a study anonymizing the patient data. Furthermore, to consult the images, it is required a password, to protect patient privacy.

*This function is enabled only for **Advanced** and **Administrator** users.*

If not enabled in setup, it is possible to activate the function during the export procedure using the relevant key.



Note: to enable the data protection in DICOM Media setup, see Paragraph 1.9.6 in Part 1 of the Technical Manual.

If enabled, the following panel will be shown:

Device: F:\ USB DISK

Volume ID: PRIMO_IMAGES

Data: Total export file size: 398 MB
Available space on the target device: 15149 MB

Data protection ☒

Password: 8430008232 Note: if password is changed, the format has to be selected again

Format: DCM JPG

Status:

Export Abort

When **Data Protection** function is enabled, a default password is automatically suggested (it is possible to change it, anyway).

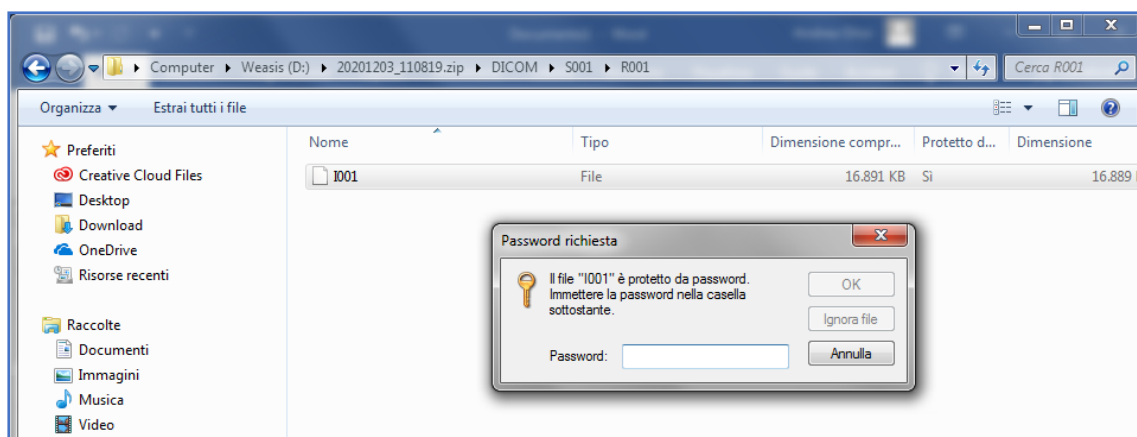
Note: if the password is changed, the format (**Dicom** or **Jpeg**) must be selected, again.

Press the **Export** key to complete the procedure (or the **Go Back** key to cancel and quit the panel).

When the procedure has been successfully terminated, it will be indicated aside the **Status**.

Status: Process completed

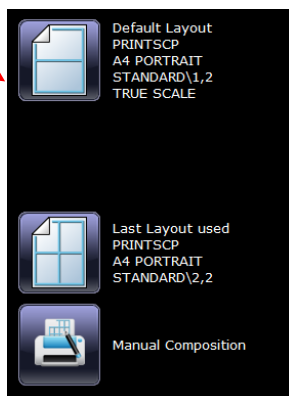
The exported study will be named by date and time of export. To refer the images saved, it will be required to enter the password created during the export procedure.



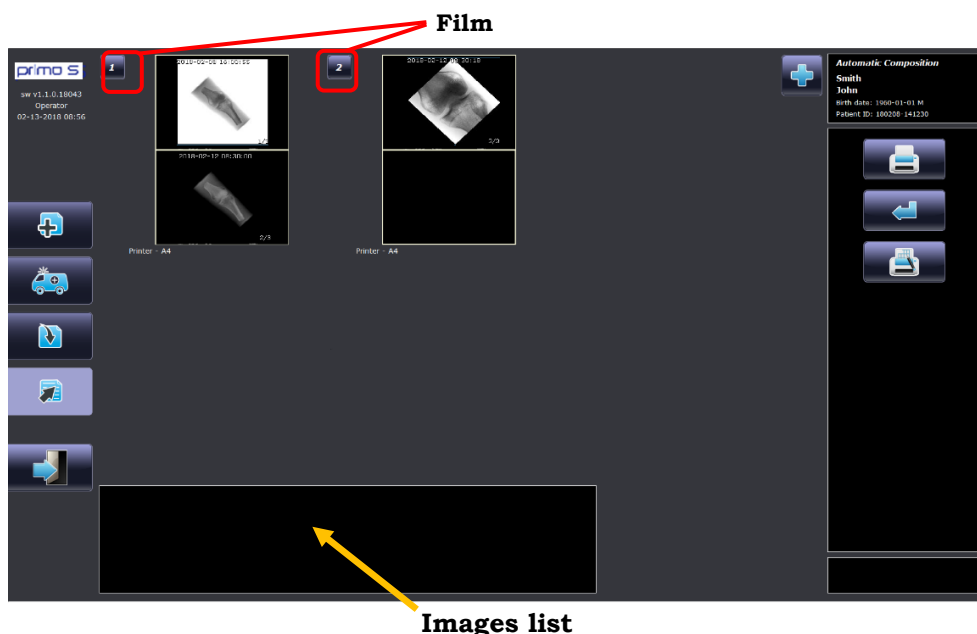
2.16.2 DICOM PRINT



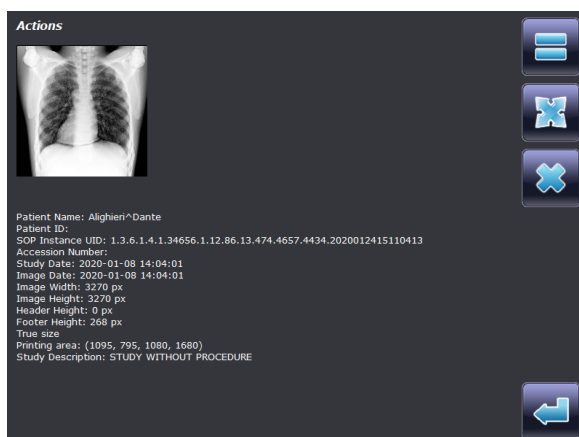
To open the **Print menu**, press the relevant key. The **Tip** button is a shortcut to print using the **default layout**, or the **last print layout used**, or skip to the **manual composition**, too.



By pressing the relevant key, the **Print menu** is opened.



If you click on an image of the automatic layout composition, it opens the following window; here you can read a little report about image and study data. On the right-hand side, there are three keys:



Duplicate the image in the images list at the bottom of the page.

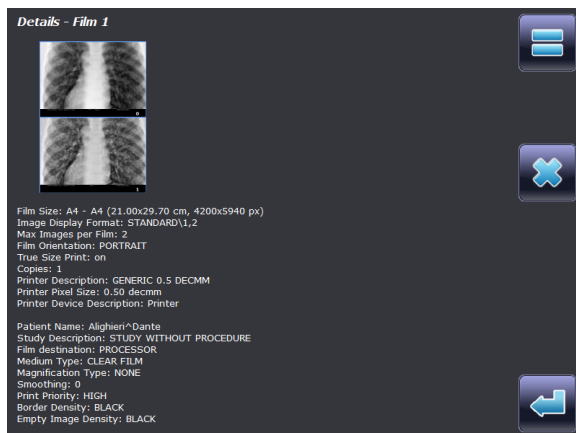
Move the image to modify the layout of the image to be printed.

Delete the image from the print layout. (It is possible to make the same operation, by double-clicking directly on the image).

Go back to the **Print menu** frame.



While if you click on the **film number**, appears a window giving details about print layout and settings:



--- ► Duplicate the same layout, without the images.

--- ► Delete the selected layout.

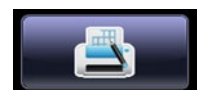
--- ► Go back to the **Print menu** frame

With the True Scale function enabled, trying to pan the image, it will be shown the whole image. So, it is possible to print the part required.

Note: Only for Administrator user: set the **True Size Correction Factor** (which must be between 70% and 130%).

Now you can:

- print the composition suggested,
- add a new film,
- go to the manual composition menu.

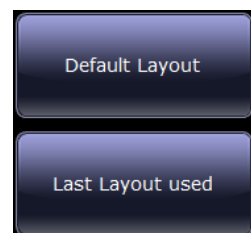


2.16.2.1 ADD A NEW FILM

Press the relevant key in the **Print menu**, to open this window; here you can create a new print layout, to add to the already existing ones.



Note: If you need to recall the **Default Layout**, or the **Last Layout used**, press the relevant button. Now, keep it as it is or use it as a basis to be adjusted.



You can set:

- The film orientation:
 - **Landscape** (horizontal);
 - **Portrait** (vertical);
- **True Size** or **True Scale**:
 - **True size** function prints the real dimension of an image (you can move it into its frame in order to view the required part of the image);
 - **True scale** function, instead, print the image adapted to its frame, displaying the whole image.
- Number of copies;
- Add annotations;
- The film format (A4, A3, etc.) depending on what has been set in **DICOM PRINT Setup** (see *Paragraph 1.9.3.2 in Part 1 of the Technical Manual*).



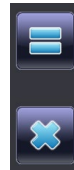
Now, you can:

- Save the layout created and go back to **Print menu**.
- Undo the layout and go back to **Print menu**.



If you save the layout, in the **Print menu**, two new keys will appear, below the **Add** one.

- Press the relevant key to add the same layout you created,
- Press the relevant key to delete layouts in the **Print menu**.



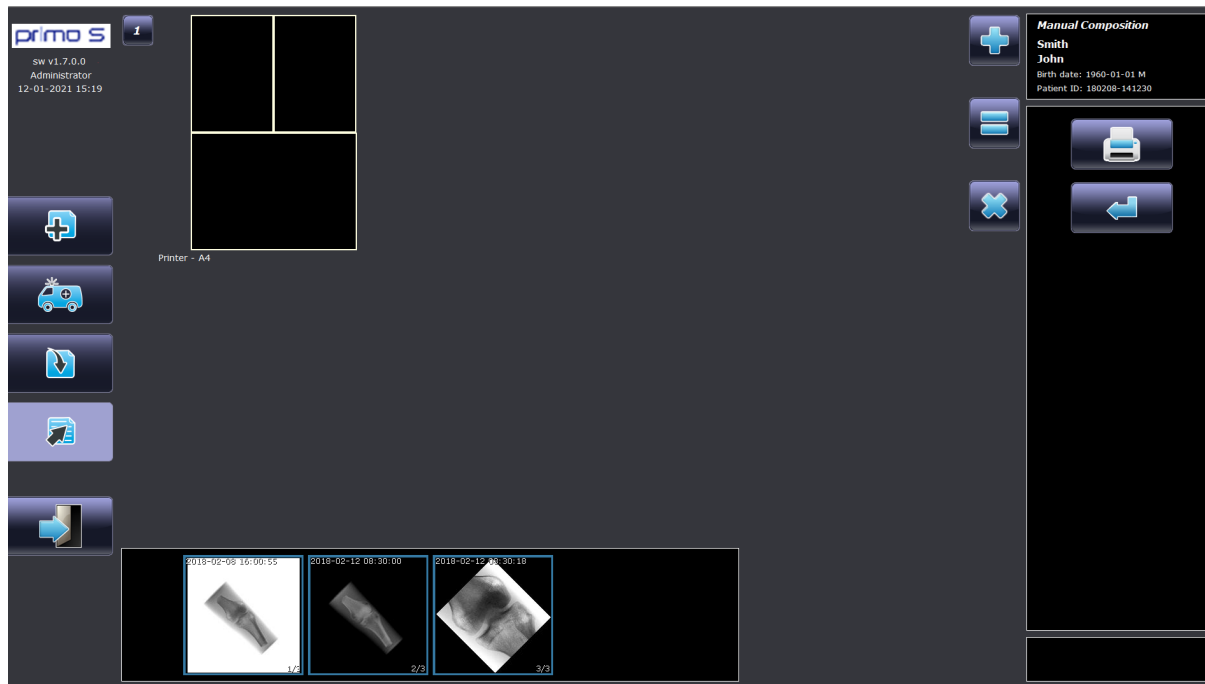
2.16.2.2 MANUAL COMPOSITION



To create a manual-composed print layout, press the relevant key.

It will open a window (the same as “add new” one); follow the steps in the previous paragraph to create your film model.

Once you save it, the **Print menu** window is opened:



Now compose your layout dragging an image in the appropriate box.

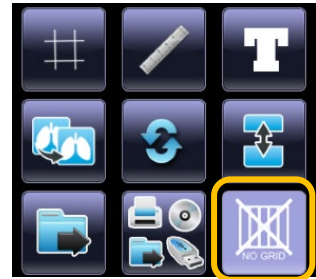
Once you created the needed film(s), touch the **Print** key to send it (them) to the DICOM printer.

Transmission of the film(s) to the print queue (Spooler) now starts. The “**Images sent to spooler**” message appears on the monitor.

2.17 NO GRID FUNCTION

If the exam is set to be acquired using an anti-scatter grid, the system will automatically remove the possible effect on the image. The system automatically recognizes the grid orientation (horizontal or vertical).

If the exam is set to be acquired without a grid, the function is off. Anyway, the function is also available in the **post-processing** frame in case a grid is used with an exam programmed without grid. Pressing the relevant button, a menu appears: select the used grid (between those saved in the **Grid Setup**) and apply the **No Grid** function.

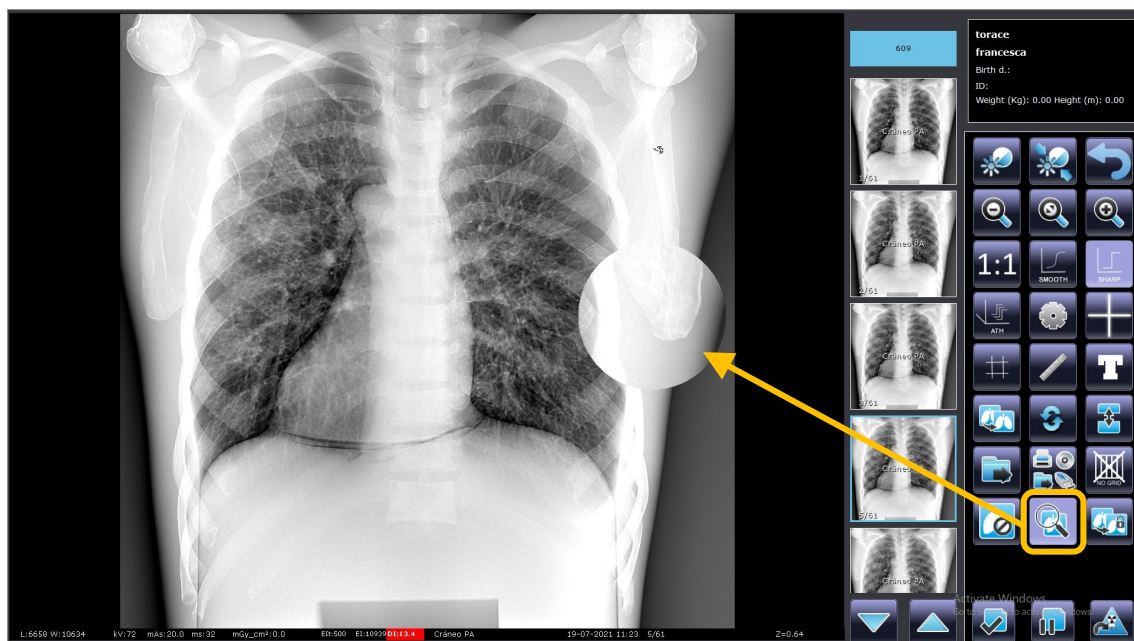


2.18 MAGNIFYING GLASS

This is a useful tool when you need to temporarily magnify a part of the image.

Press the relevant key and then touch the required part of the image: this will be shown enlarged (as in the figure below).

Press again the relevant key to turn off the function.



3 ANNEXES

3.1 TRANSFERRING IMAGES VIA DICOM

You can send images via the DICOM protocol network:

- to a DICOM server or to a workstation, using the STORE DICOM function, to save them (see paragraph 3.1.1).
- to a printer using the PRINT DICOM function.
You can send one or more manually or automatically composed images in one or more films using the Report Tool (see paragraph 3.1.2).

You can check if the transfer has been successfully accomplished via the DICOM SPOOLER (see paragraph 3.1.3).

It is possible to:

- 1) send a single image from the **Image Processing frame**,
- 2) send an entire study from the **Study List frame**,
- 3) send one or more images in a study using the **Report Tool menu**.

Note: images, together with the related dose report, are automatically saved in the hard disk of the device. If the connection with DICOM server is temporarily lost, they can be sent when the connection is restored.

3.1.1 DICOM STORE

- 1) Use the relevant key in the **Image Processing frame** to transfer the single image currently shown on the monitor:



Now choose to which node send the image and press its key. A message appears to confirm the send has been successfully accomplished ("Image sent to store").

When an image has been successfully sent to Store, it is marked with this icon.



The same icon is shown on the study, the image you send belongs to.



2) Use the relevant commands in the **Study List** to store one or more selected studies:

- press the indicated key to choose which one of the DICOM servers available to use.



- press the indicated key to directly send the selected study to the server that has been set as the default one (in **DICOM setup**, see *Paragraph 1.9.4 in Part 1 of the Technical Manual*).



“Study sent to store” message appears to confirm the send has been successfully accomplished.

3) From the Study List frame, after selecting a study, it is possible to open the **Report Tool** menu to choose the images to be sent:



- The Report Tool menu shows all the images in the study. It is possible to select, one by one, the needed images, or:

- Select all images



- Undo the images selection



- Reverse selection (selected ones become unselected and vice versa)



- Use the relevant commands in the **Study List** to store one or more selected studies:

- press the indicated key to choose which one of the DICOM servers available to use.



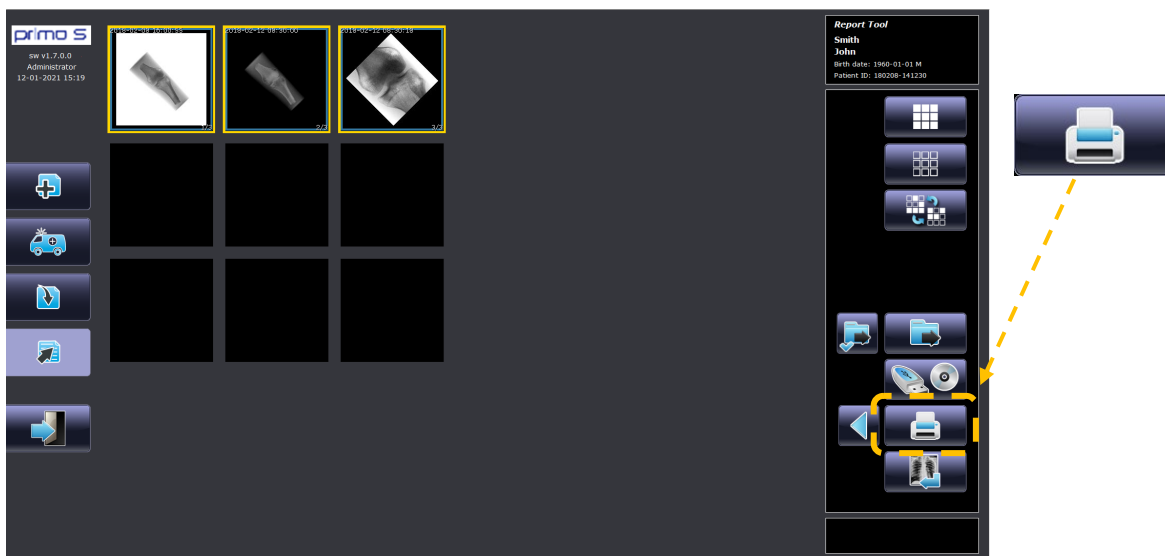
- press the indicated key to directly send the selected study to the server that has been set as the default one



"Study sent to store" message appears to confirm the send has been successfully accomplished.

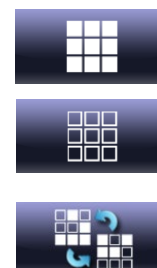
3.1.2 DICOM PRINT

In the **Report Tool** menu, you can also print the images using the PRINT DICOM function (see *Paragraph 2.16.2, in Part 2 of this manual* for further information):

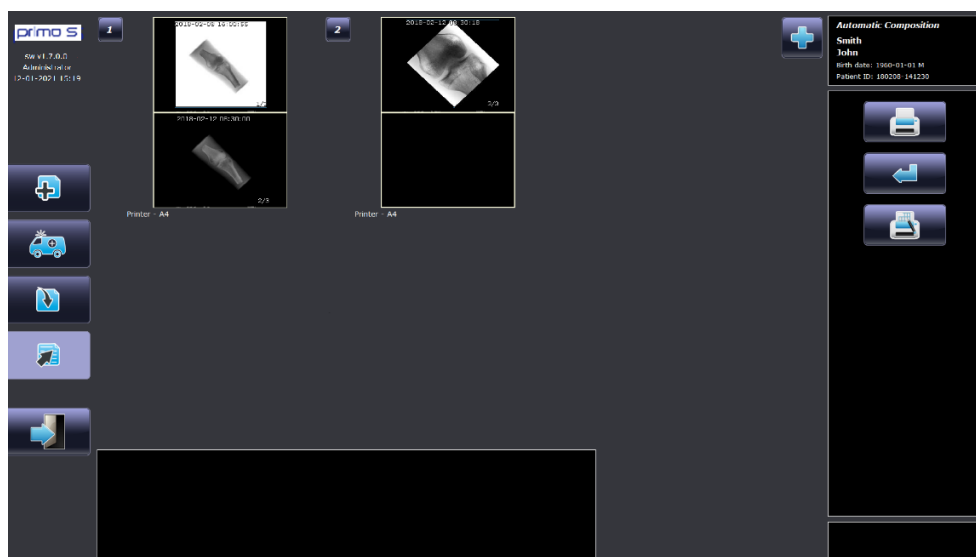


- The Report Tool menu shows all the images in the study. It is possible to select, one by one, the needed images, or:

- Select all images
- Undo the images selection
- Reverse selection (selected ones become unselected and vice versa)



- Click on the **Print** key to open the Automatic Composition screen; the images selected before are now automatically composed in film(s), according to the previously set print layout.



- Here you can:

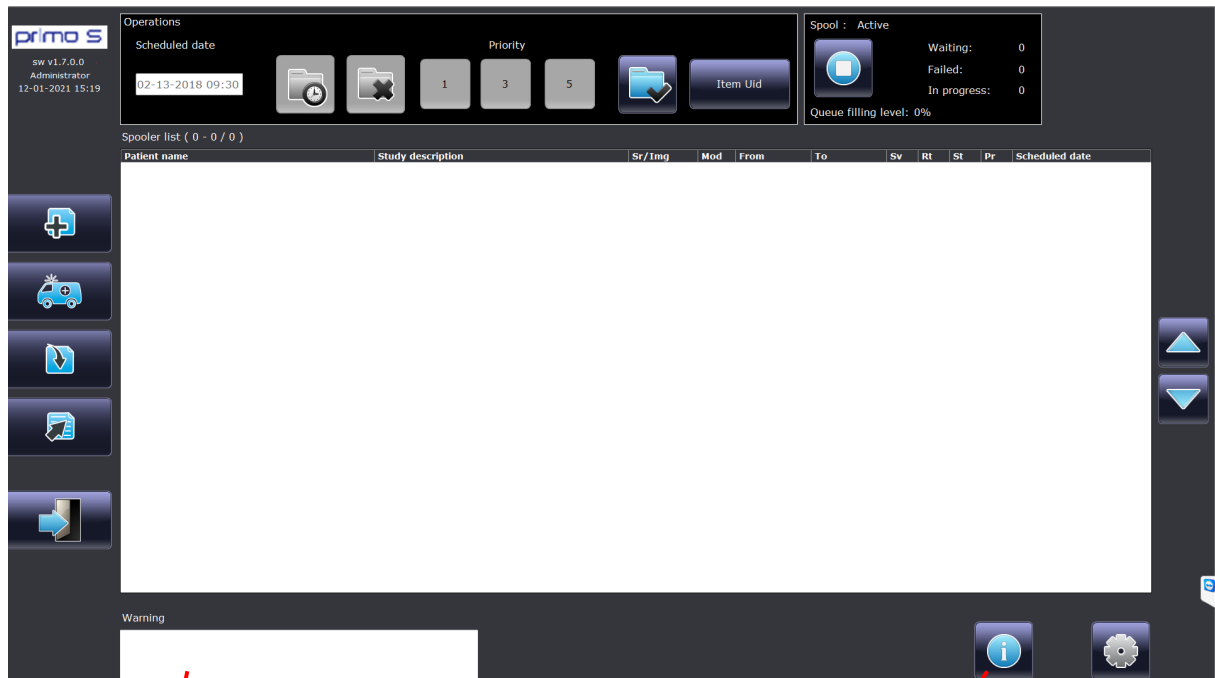
- **Print** all the films shown:
- **Delete** the composition and return to the previous page:
- Switch to **Manual** mode and manually compose a new film layout
(see Paragraph 2.16.2.2, in Part 2 of this manual for further information).



3.1.3 DICOM SPOOLER

The **DICOM Spooler** function manages the transmission of images to the DICOM nodes via a buffer memory (on the Hard Disk) where the images to be transmitted are stored in a queue.

Press the relevant key in the Study List frame, to access the **Spooler** menu:



**Warning Message
Area**

Spooler legend

Settings

The **Status** panel shows the status of the images and their transmission in real time. It contains the following details:

Spool : Active



Queue filling level: 0%

Waiting: 0

Failed: 0

In progress: 0

Spool	Spooler status (active / disabled)
Waiting	Number of images in the queue
Failed	Number of images not sent (error or system malfunction)
In progress	Number of images currently being sent
Queue filling level	Filling level (in %) of the transmission queue

The transmission status of each image in queue is also shown in the **St** (Status) column in the main panel:

Operations

Scheduled date: 21-07-2011 08:56




Priority: 1 3 5



Item Uid

Spooler list (0 - 0 / 0)

Patient name	Study description	Sr/img	Mod	From	To	Sv	Rt	St	Sr	Scheduled date
KNEE LAT 1		1/1	DX	PRIMO	ATS_PACS		3			21-07-2011 08:56
THORAX 1		1/1	DX	PRIMO	ATS_PACS		2			21-07-2011 08:57
PELVIS HIP 1		1/1	DX	PRIMO	ATS_PACS		1			21-07-2011 08:57
PELVIS HIP 1		2/1	DX	PRIMO	ATS_PACS		1			21-07-2011 08:57

Spool : Active

Waiting: 2

Failed: 1

In progress: 1

Queue filling level: 3.3%

St








This key shows a legend to recall symbols used.

STATES OF SPOOLER

 Waiting the first send.

 Waiting the re-send (the previous has failed).

 Sending.

 Sending failed (3 attempts).

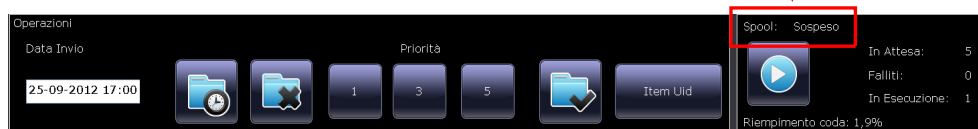
 Creating the DICOM object to be printed.

 Problems in the creation of the DICOM object.

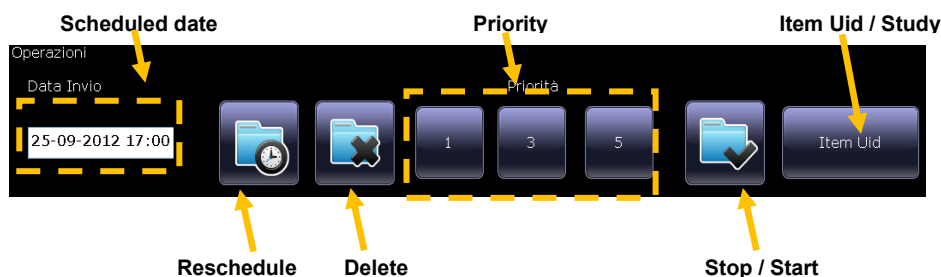
 Printing done.
Problems deleting images:
cancel them manually.

 Store done.
Problems deleting images:
cancel them manually.

In the **Status** panel, click on the **Stop** key  to stop the transmission (**Spool: Disabled**). This enables the Operations commands:



To manage an image still in the transmission queue, use the functions in the **Operations** panel:



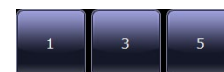
It is possible to:

- **Delete** one or more selected images in the transmission queue:
- **Set the re-transmission date** of a selected image entering it in the **Scheduled date** window and then order the new transmission request using the **Reschedule** key:



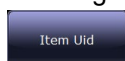
Note: this function is meant to be used when a first attempt to store an image failed.

- **Set the transmission priority** for the selected images using these commands:
1 = low priority, 3 = normal priority, 5 = high priority

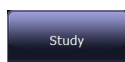


- Change the description field of an image in the Spooler. The options are:

- **Item Uid**



- **Study description**

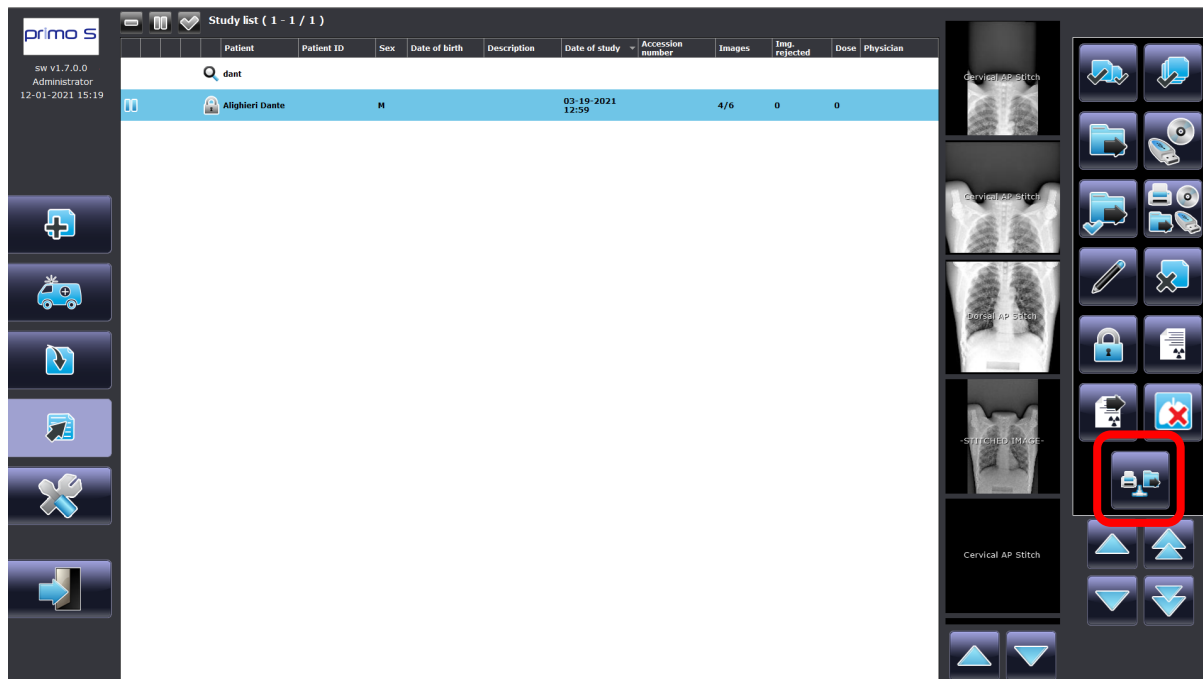


Use the **Start** command to restore the Spooler to normal operation:



When **Spool: Active**, the commands in the Operations panel are disabled.

You can check the **Spooler** status from the Study List frame, too.



The Spooler key changes depending on the status:

- Spooler contains images to be transmitted.
- The system is sending images,
- The Spooler is in **warning** status.
Press the Spooler button to display the warning in the relevant box.



3.2 SAVING IMAGES ON CD/DVD OR USB DEVICE

It is possible to save images in **DICOM** format (or the required one between **JPEG**, **PNG**, and **BMP**) on a CD/DVD, or on a USB memory device.

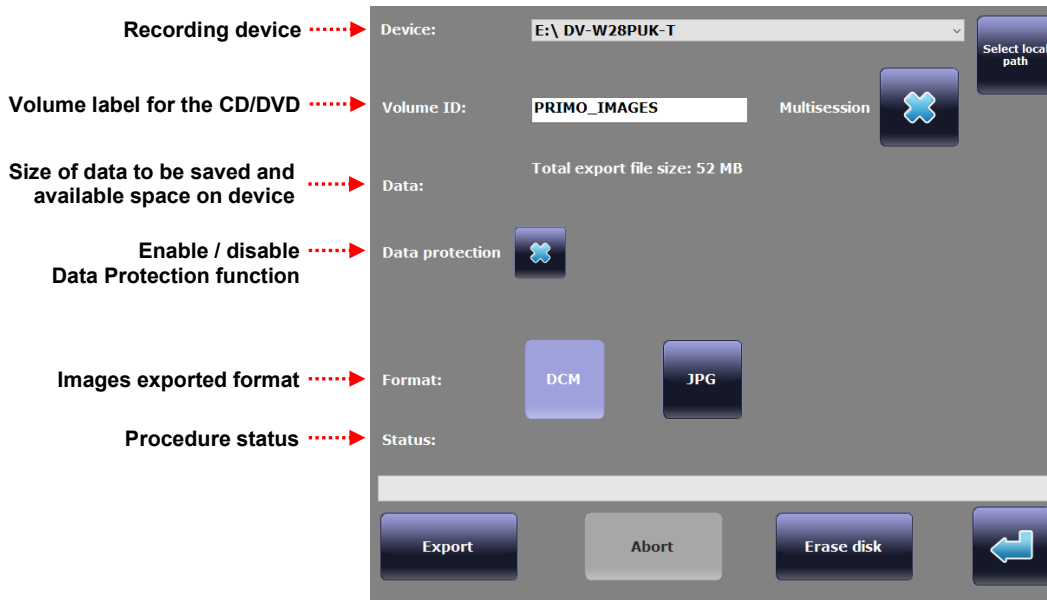
- **Save selected images in a study:**
Open the **Report Tool** menu, using the related key.



This lets you select the images required.



Then, press the indicated key to save the selected images, and the recording window is opened:



- Enable or disable the Data Protection function (see *Paragraph 2.16.1.1 in Part 2 of this Manual*).

- Select the format (if it differs from the default one) and start saving the files onto CD or USB device by pressing the **Export** key.
- Once the images have been saved, in the **Status** field appears the message “**Process completed**”: the saving procedure has been successfully accomplished.
- Once the saving operation has been accomplished, press **Exit** key to close the procedure.

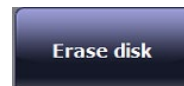


For Administrator and Advanced Users, only, it is possible to:

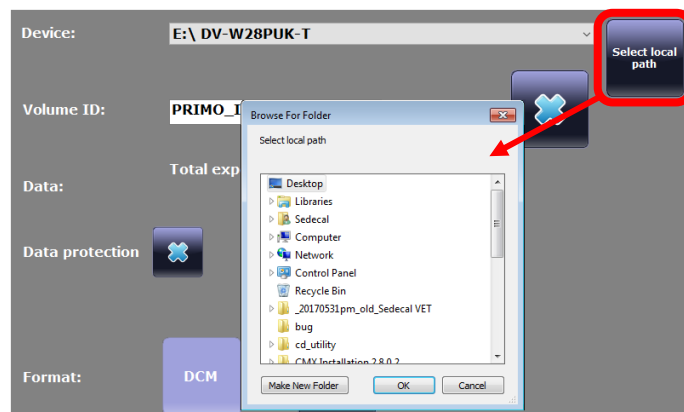
- **Save a whole study:**
Select the study and press the indicated key in the Study List: the recording window is opened.
The saving procedure is the same as for described above.



Note: *Erase disk key is meant to delete data on a rewritable disk (only for Advanced User and Administrator).*



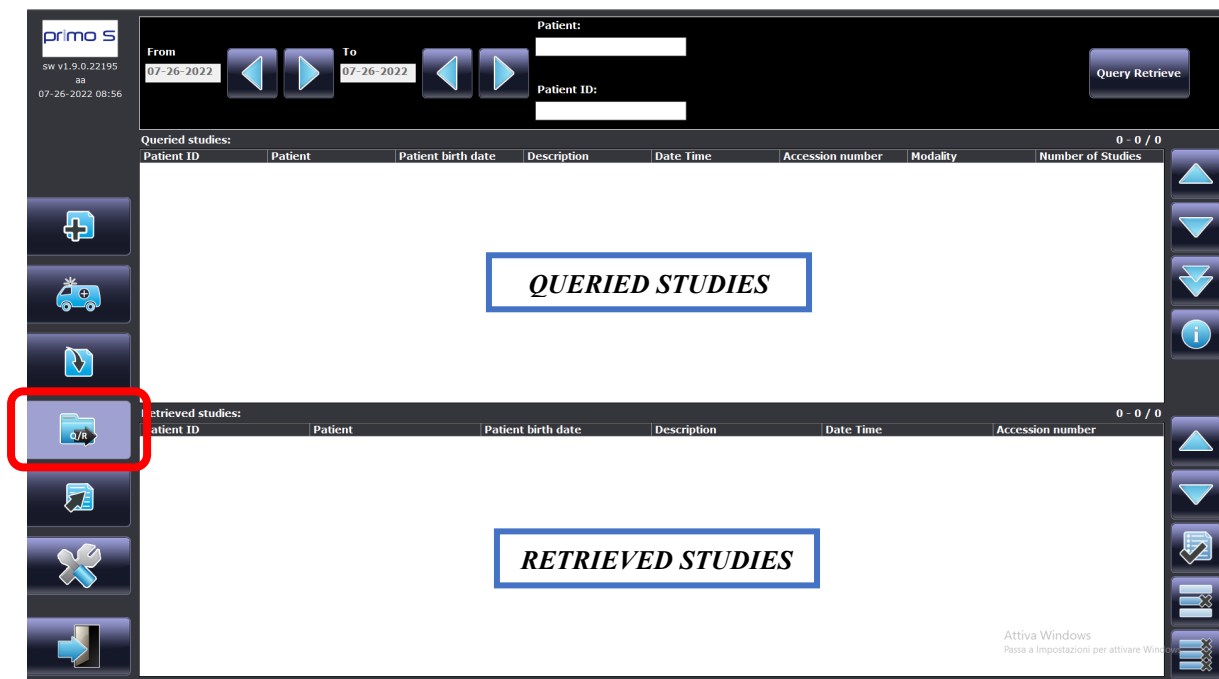
It is even possible to save the images directly on your equipment hard disk, using the **Select Local Path** button. Press the indicated key and a window to choose where to save images is displayed.



3.3 QUERY / RETRIEVE

The DICOM QUERY / RETRIEVE functions let you view digital images generated by other image diagnostics programs on the equipment (e.g. CT, MR, ECHO, etc.). This is useful, for instance, when comparing acquired images with those in the hospital archive for the same patient.

The indicated key opens the QR menu:



The QUERY function searches for all the studies concerning a given patient in the hospital archive. This may be done by using these parameters: **Patient Name** or **Patient ID**. All the results that satisfy the search conditions are then listed in **Queried studies** box.

After selecting the one of interest, use the **Retrieve** function to copy the selected study on the local disk.



You can now:

- Open the study of interest in the list (once it has been selected) using this key:
- Delete the selected study using this key:
- Delete all the studies retrieved using this key:



The system comes with a software called **Weasys Viewer** allowing the visualization of the images in the retrieved studies.