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TUBES & DEVICES

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To: _____

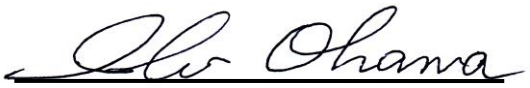
Receipt Signature and Date

_____ _____

Please return one of specification after your receipt signature.

This specification will be applied to the serial delivery or lot delivery until obtaining your signed specification or your counter proposal to be agreed.

SPECIFICATION
FOR
FLAT PANEL IMAGER
FDXA4343R



Shinji Ohama

General Manager
Sales Department

Specification Number: Rev.0
Issued : 2017-12-12
Revised :

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****Hereinafter, the company name "Toshiba Electron Tubes & Devices Co., Ltd" is stated "TETD".**

* Limitation of Product Liability

In case you receive a claim from a third party that any loss or damage to property, bodily injury or death of a person was caused by a defect of the component, you shall immediately notify TETD of such claim and consult with TETD for any actions to be taken. In any event, TETD’s liability shall be confined to the extent reasonably foreseeable and proximately caused by the defect of component with a limitation of aggregated amount paid by you for the components.

Provided, however, TETD shall not be liable in the cases, where,

(1) it was impossible for TETD to discover the defect based upon the state of scientific or technical knowledge at the time of delivery to you,
(2) the defect is due to the compliance with your instruction regarding the specification or design,
(3) you failed to incorporate fail-safe design to your products in consideration of the reasonably expected failure ratio/pattern of the Components incorporated therein,
(4) the defect is due to the compliance with mandatory regulations/standards issued by the public authorities ; or
(5) the defect did not exist at the time of delivery.

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■ INTENDED USE

FDXA4343R is an X-Ray FLAT PANEL IMAGER for radiographic use. This device can be used with an X-ray generator. It provides digital signal by detecting X-rays which pass through patient body and strike its surface. It does not provide clinical image, nor function of controlling X-ray generator.

For medical diagnosis, it additionally requires image processing with application software to visualize digital image. It is not intended to use for mammography, and angiography applications. This unit is not intended to be transferrable. Install it permanently at a specific location, or mechanically fix it such that a tool is required for removal.

1. COMPOSITION OF SYSTEM

1.1 Parts Names

1. Sensor Unit 1
2. Interface Box 1
3. AC Cable ..... 1.8 m×1
4. Ground (GND) Cable for Sensor Unit ..... 3 m×1

1.2 Options Accessories

DC Cable (Sensor Unit – Interface Box)

	Name	Length	Notes
1	ECB-F044A-R05/G	5m	Including connectors
2	ECB-F044A-R10/G	10m	Including connectors

* Please contact to our local sales for further information.

2. APPLYCABLE STANDARDS

IEC60601-1:2005+A1:2012

IEC60601-1-2:2007

3. SPECIFICATION

3.1 Flat Panel Sensor Unit:

Sensor Protection Plate ..... Carbon Fiber Plate
Cooling ..... Natural Air Cooling
Power Consumption ..... Maximum 21W
Overall Dimensions..... 495.5×495.5×15.8mm (W(H)×D(V)×H)
Weight ..... 4.3kg (approx.)

3.2 Interface Box:

Input AC100-240V, 50/60Hz
Output ..... DC24V 2.5A 60W(MAX)
Overall Dimensions..... 280×100×50mm (W(H)×D(V)×H)
Weight ..... 1.1kg (approx.)

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3.3 Image Format

X-ray Conversion Layer
Cesium Iodide (Csl) with Amorphous Silicon (a-Si) Photodiode
Active Area
426(H)×425(V)mm (16.8×16.7 inch)
Pixel Matrix
3040(H)×3036(V)
Pixel Pitch
140 μm
Cycle Time
Shot to Shot (Single Exposure, EXP period 500msec) 6sec.
Exposure time
Standard 500ms(500ms to 4000ms(by 500ms step)) selectable by command
A/D Conversion
16bit
Output image format
16bit grayscale Tiff.
Image size 3040×3036 pixels

3.4. RATINGS

Maximum X-ray tube voltage
150 kV
Minimum tube voltage
40 kV
Minimum distance between X-ray tube focal spot to Input plate of FDXA4343R
730 mm

3.5 Interface

Data Output
16 bit Digital Output Ethernet (1000BASE-T)
Command Control
Ethernet (1000BASE-T)
Power Input
DC24V 2A (from Interface Box)

3.6 Functions

3.6.1 Operation Sequence

There are three types of operation sequences as follows.

- Auto Exposure Detection (AED)
- Hard exposure;
  Communication through D-Sub connector
- Soft exposure;
  Communication through Ethernet

3.6.2 X-ray exposure mode

Three types of exposure modes are available.

- Single exposure
- Double exposure
- Combo exposure

3.6.3 Dual use

The detector can switch IP address with the switch.

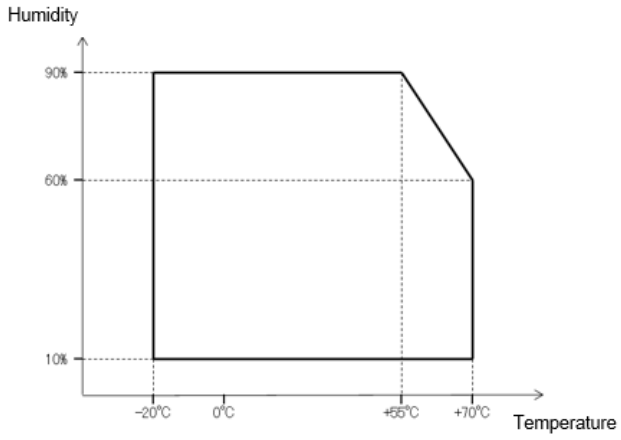
Select	IP address
IP0	192.168.95.68
IP1	192.168.95.69

3.6.4 LED display functions

Sensor unit has LED displays, which indicate each status. The contents of status and display methods are shown below.

Name	Status
PWR	Turn on when power on
LAN	Turn on when FPI system can communicate with Ethernet

4. ENVIRONMENTAL

	Environmental conditions for storage and transport (See remarks.)	Environmental use conditions	Remarks
Temperature	−20 to 70°C	+10 to 35°C	Storage condition range  Caution ・Avoid dew condensation anytime, including during use, transport or storage. ・Unpack the product after it sufficiently fits into a new environment. ・About 8 hours or more is required for environmental fitting.
Humidity	10 to 90% (No dew condensation allowed)	10 to 85% (No dew condensation allowed)	
Atmospheric pressure	50 to 106 kPa	70 to 106 kPa	—

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5. CHARACTERISTICS

(Standard condition: Exposure time 500ms, See 17. PERFORMANCE TESTING METHOD AND STANDARDS of this document for testing conditions.)

Image noise (without X-ray exposure)

Total noise:≦ 12.0 LSB

MTF

45%(Typ.)、42%(Min.)　at 2Lp/mm,70kVp

DQE

56%(Typ.)、50%(Min.)

Defects

Line Defects

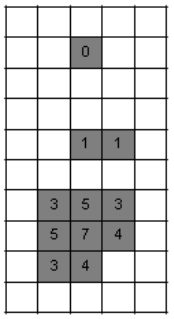
Vertical line defects: Maximum 20 lines

Horizontal line defects: Maximum 20 lines

Defect lines must be separated by at least 10 normal lines.

Pixel Defects

Class 0 defects: Maximum 2500 Pixels
Class 1 defects: Maximum 1200 Pixels
Class 2 defects: Maximum 600 Pixels
Class 3 defects: Maximum 360 Pixels
Class 4 defects: Maximum 120 Pixels
Class 5 defects: Maximum 60 Pixels
Class 6 defects: Maximum 30 Pixels
Class 7 defects: Maximum 20 Pixels
Class 8 defects: Maximum 0 Pixels



Class #0: 1pixel
Class #1: 2pixels
Class #3: 3pixels
Class #4: 2pixels
Class #5: 2pixels
Class #7: 1pixel

Glay pixels indicate defect, the number indicate class

Definition

Defect Class is defined as the number of neighboring defect pixels from each defect pixel.

The defect pixels on line defect are not counted as defect class.

Maximum input dose (Linear)

Maximum: 35μGy

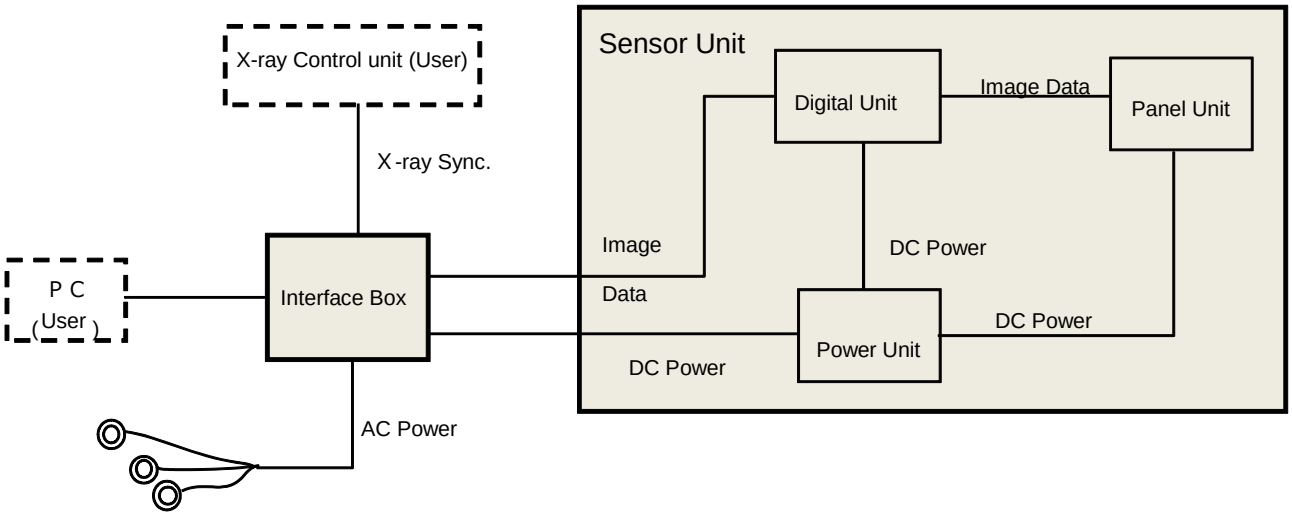
Resolution

≧3.4 Lp/mm

6. IMAGE ACQUISITION DRIVE

6.1 Block diagrams

Connect FPI with user PC and/or X-ray controller as block diagrams show as below.



6.2 Communication availability

Signal Name	Type	Ethernet Command Control (PC)	D-Sub Signal Control (X-ray Controller)
EXP_REQ	INPUT	OK	OK
EXP_OK	OUTPUT	N.A	OK

*EXP_REQ Command Response

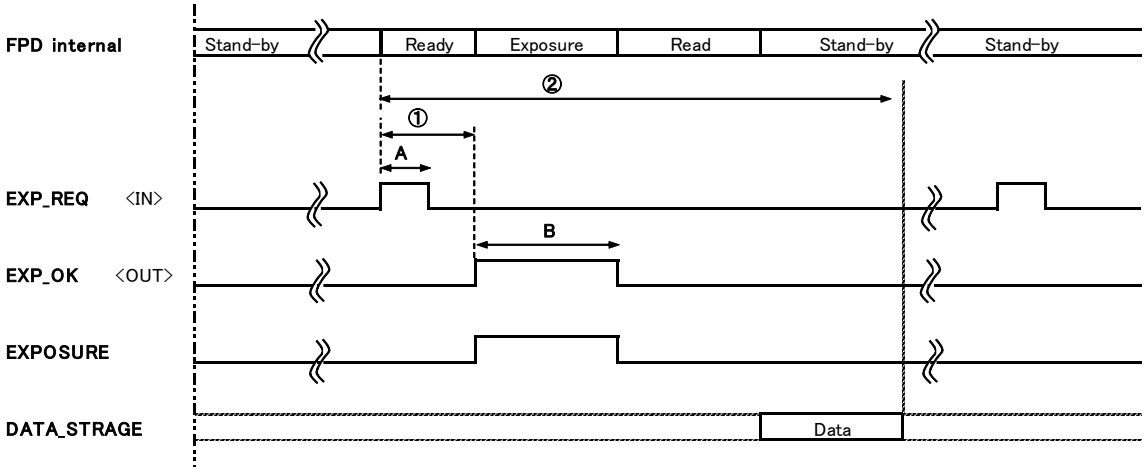
6.3 Image Acquisition Control Interface:

D-Sub Signal Control Interface Operation Sequence

Description of the sequence

1. By receiving “EXP_REQ” during “Refresh” status proceeds to “Exposure” after completion of “Refresh”.
2. Continue “EXP_OK” signal ON during “Exposure”. ON period is defined by Image Acquisition mode table.
3. Proceed to “Data Read” after completion of Exposure.
4. After “Read”, FPI proceeds to status of “Refresh”.

(1) Single Exposure

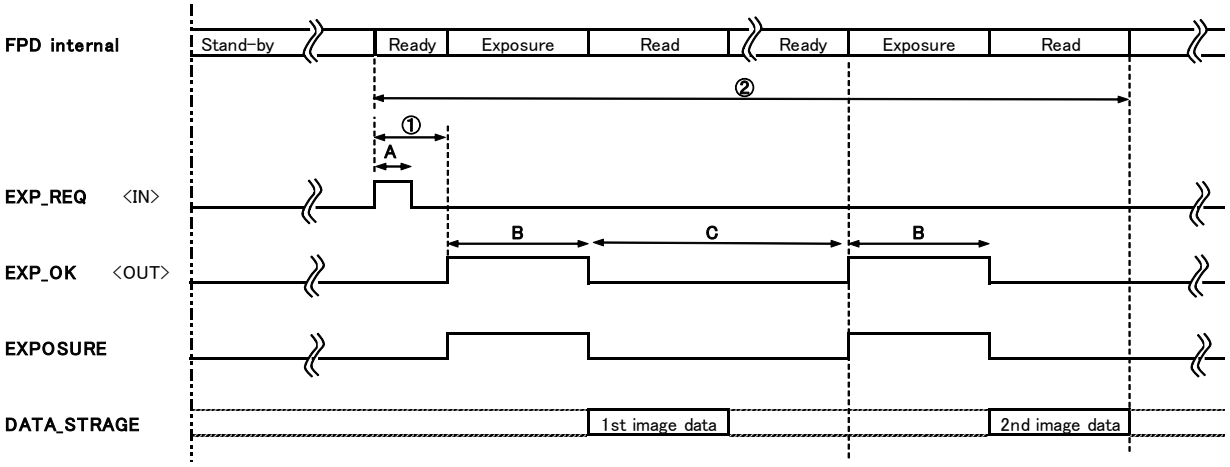


FPI ENABLED

A: EXP_REQ width
Minimum 1 ms
B: EXP period
Set value: standard 500 ms (500 to 4000ms (by 500ms step)) selectable by command.

① : EXP_REQ - EXP_OK period Maximum 300 ms
② : EXP_REQ - DATA STORAGE period Maximum 2000ms (case EXPOSURE 500 ms)

(2) Double Exposure

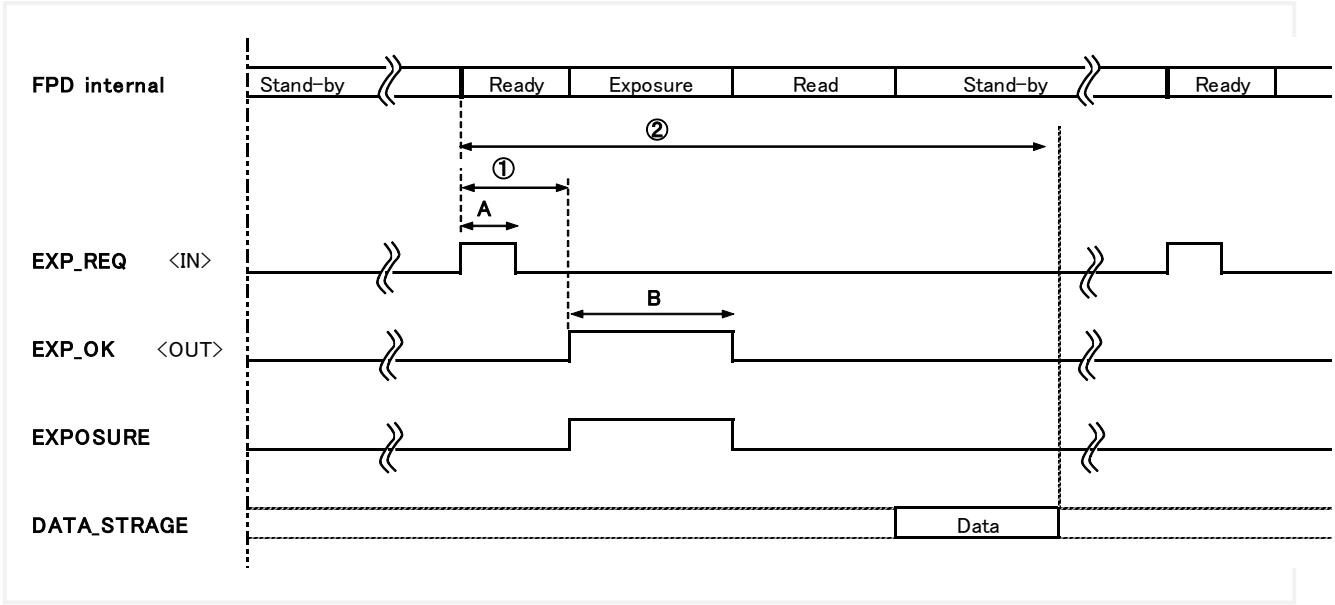


FPI ENABLED

A: EXP_REQ width
Minimum 1 ms
B: EXP period
Set value: standard 500 ms (500 to 4000ms (by 500ms step)) selectable by command.
C: Preparation period:1sec

① : EXP_REQ - EXP_OK period Maximum 300 ms
② : EXP_REQ - DATA STORAGE period Maximum 2000ms (case EXPOSURE 500 ms)

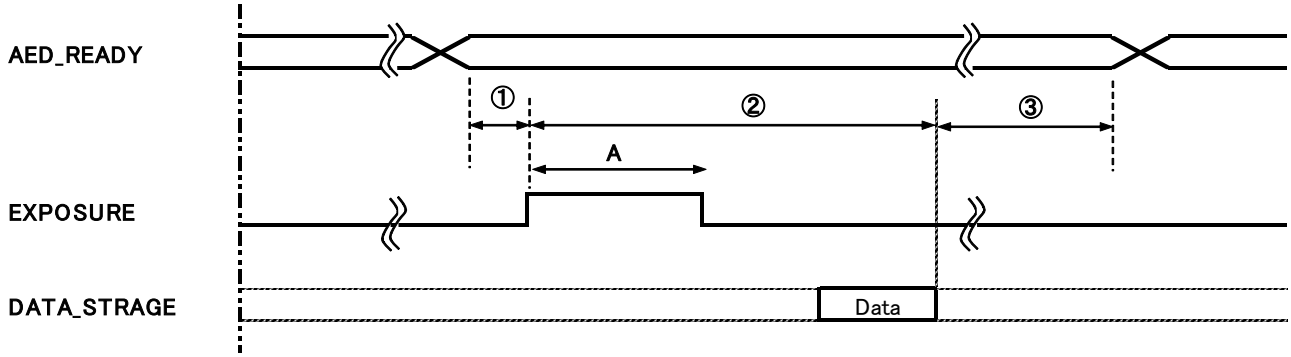
(3) Combo Exposure



A: EXP_REQ width
Minimum 1 ms
B: EXP period
Set value: standard 500 ms (500 to 4000ms (by 500ms step)) selectable by command.

② : EXP_REQ - EXP_OK period Maximum 300 ms
② : EXP_REQ - DATA STORAGE period Maximum 2000ms (case EXPOSURE 500 ms)

(4) AED Exposure



A: EXP period
Set value: standard 500 ms (500 to 4000ms (by 500ms step)) selectable by command.

① : AED_READY - EXPOSURE period 100 ms
② : EXP_REQ - DATA STORAGE period 3000ms (case EXPOSURE 500 ms)
③ : DATA_STRAGE - AED_READY period 2000ms (case EXPOSURE 500 ms)

6.4Image Acquisition Control Interface:

6.4.1. Pins assign

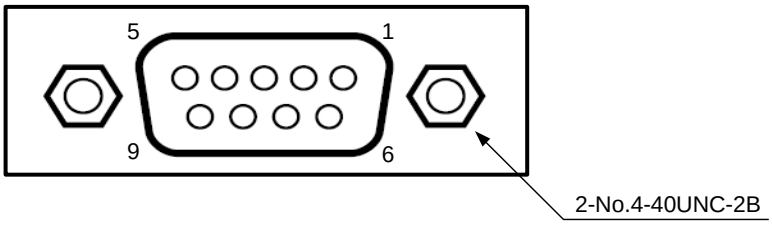
Pin No	Signal name	I/O	Contents
1	NC	-	Not connected
2	EXP_REQ+	Input	Image acquisition (X-ray exposure) Request signal +
3	EXP_OK+	Output	Image acquisition (X-ray exposure) Period signal +
4	EXP_OK+ (OC)	Output	Open Collector +
5	NC	-	Not connected
6	NC	-	Not connected
7	EXP_REQ-	Input	Image acquisition (X-ray exposure) Request signal -
8	EXP_OK-	Output	Image acquisition (X-ray exposure) Period signal -
9	EXP_OK- (OC)	Output	Image acquisition (X-ray exposure) Period signal (Open Collector)-

*1Please put the protective resistance more than 1.4 kΩ in the series.

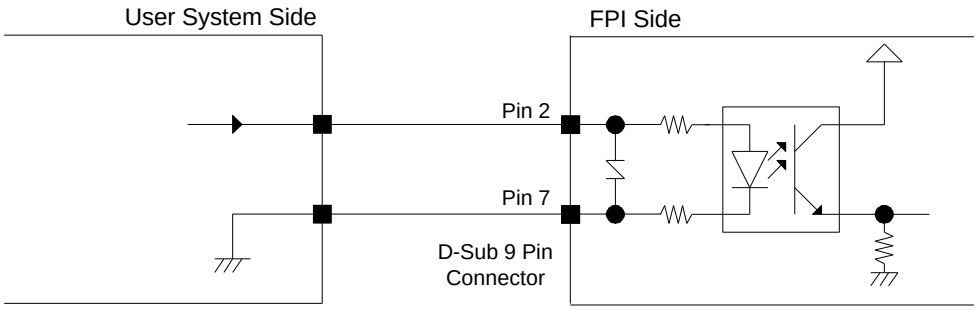
*2 Maximum sink current is 20 mA.

6.4.2. External Interface (EXT-INF)

(1) D-Sub 9pin female (Front View)



(2) Input Circuit



	Symbol	Min.	Typ.	Max.	Unit
Input Voltage	Vih	5	-	28	V
	Vil	0	-	1	V

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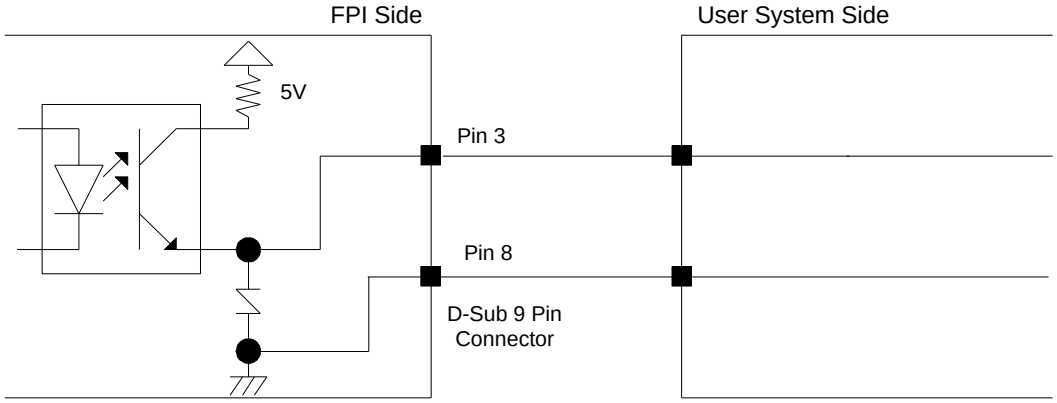
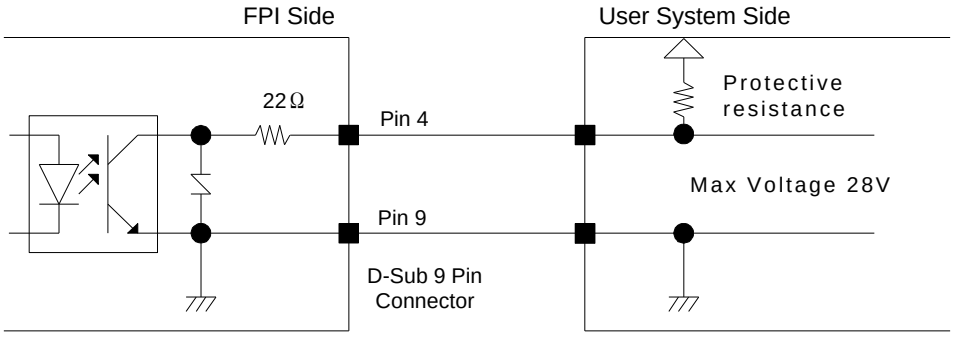
(3). Output Circuit

5V CMOS Level Type



Open Collector Type



Protective resistance more than 1.4kΩ must be inserted in series.

7. INSTALLATION METHODS

Follow the procedure described below by referring to the outline drawing when installing the sensor unit and the interface box on the equipment.

(1) Use the five M4 screw holes (5 mm depth) for the sensor unit.

(2) Use all screw holes for fixing. Use screws with the body length below the screw head being shorter than the hole depth.

(3) The flatness of the equipment installation surface should be within 0.2 mm.

(4) Before mounting the sensor unit, clean off dust and foreign material from each mounting surface on the side of the equipment-side sensor unit.

(5) Tightening torque of 1.5 Nm should apply for mounting the sensor unit.

(6) If no screw is used, be sure to use a tool for fixing and apply a method providing fixing strength equivalent to that reached by using screws.

8. MAINTENANCE AND CHECK

Please follow according to manuals.

9. PRODUCT OUT GOING TEST

Following items are tested for all products. The test results are recorded to inspection sheet and attached to the products.

Note: Below data are measured after image calibration (defect correction, offset correction and gain correction) by TETD's original viewer application.

1. Resolution
2. Image noise
3. MTF
4. DQE

Meanwhile below items are checked during TETD's internal approval test.

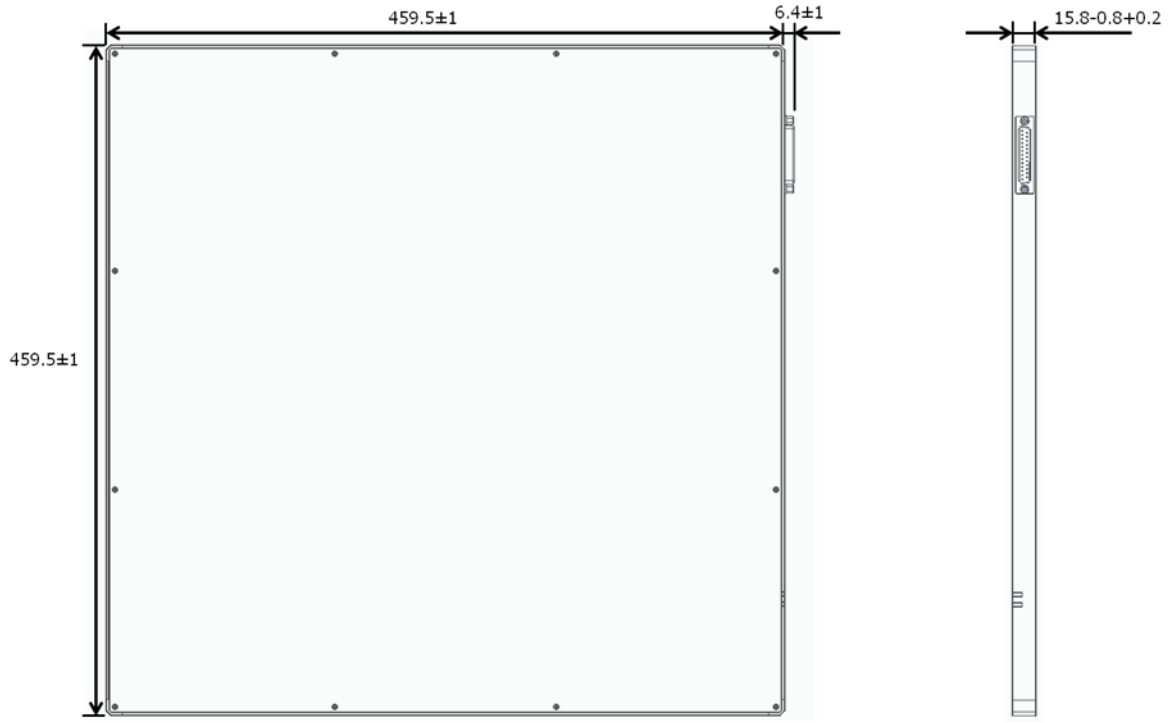
1. Maximum input dose

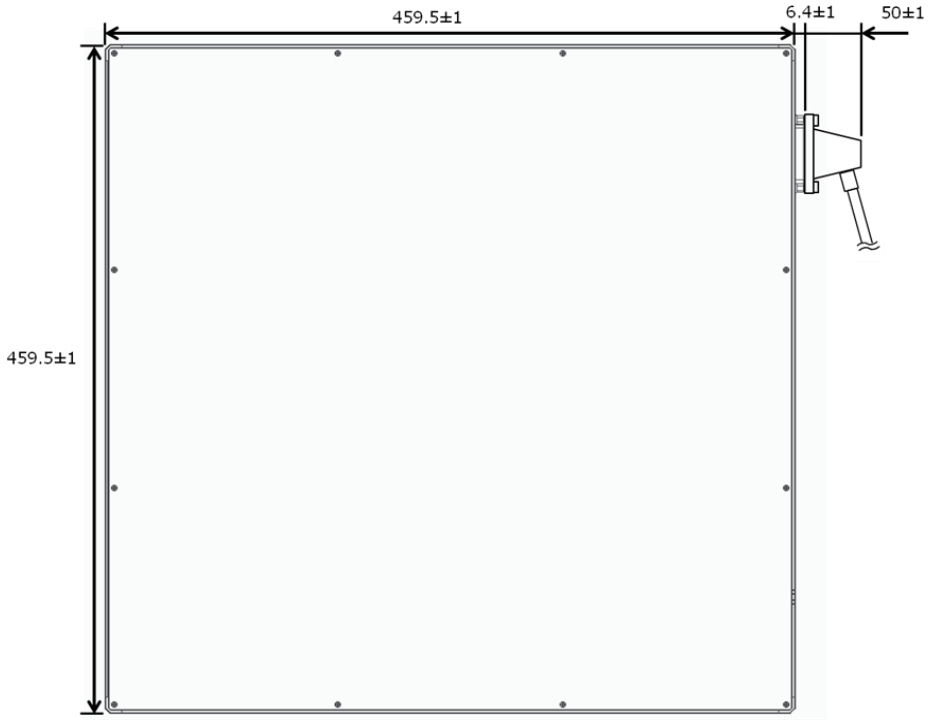
10. OUTLINE DIMENSIONS

10.1 Sensor unit

Flat Panel Sensor Unit (X-ray input plate)

Unit: mm





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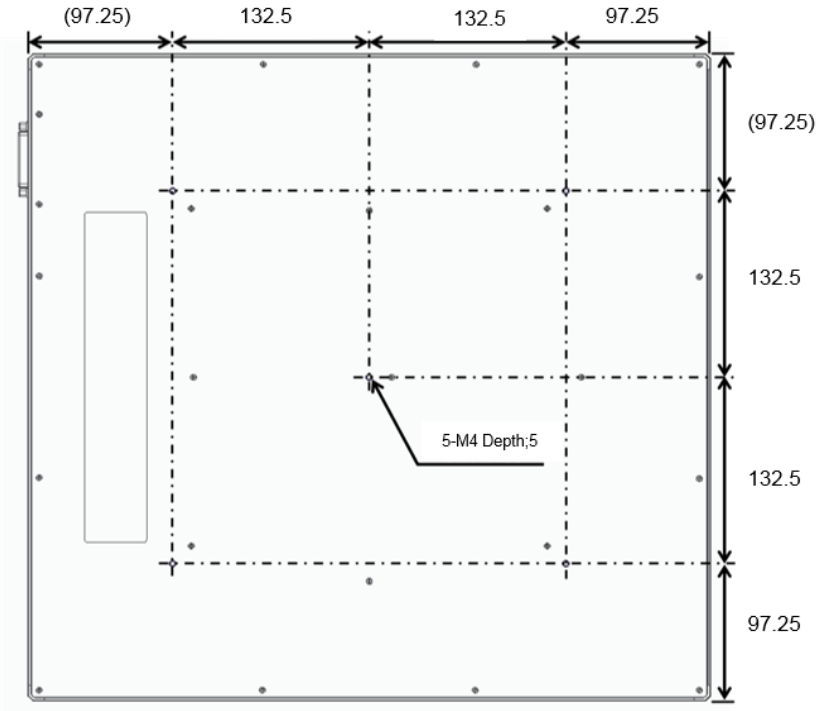
Flat Panel Sensor Unit (installation surface)

Unit: mm



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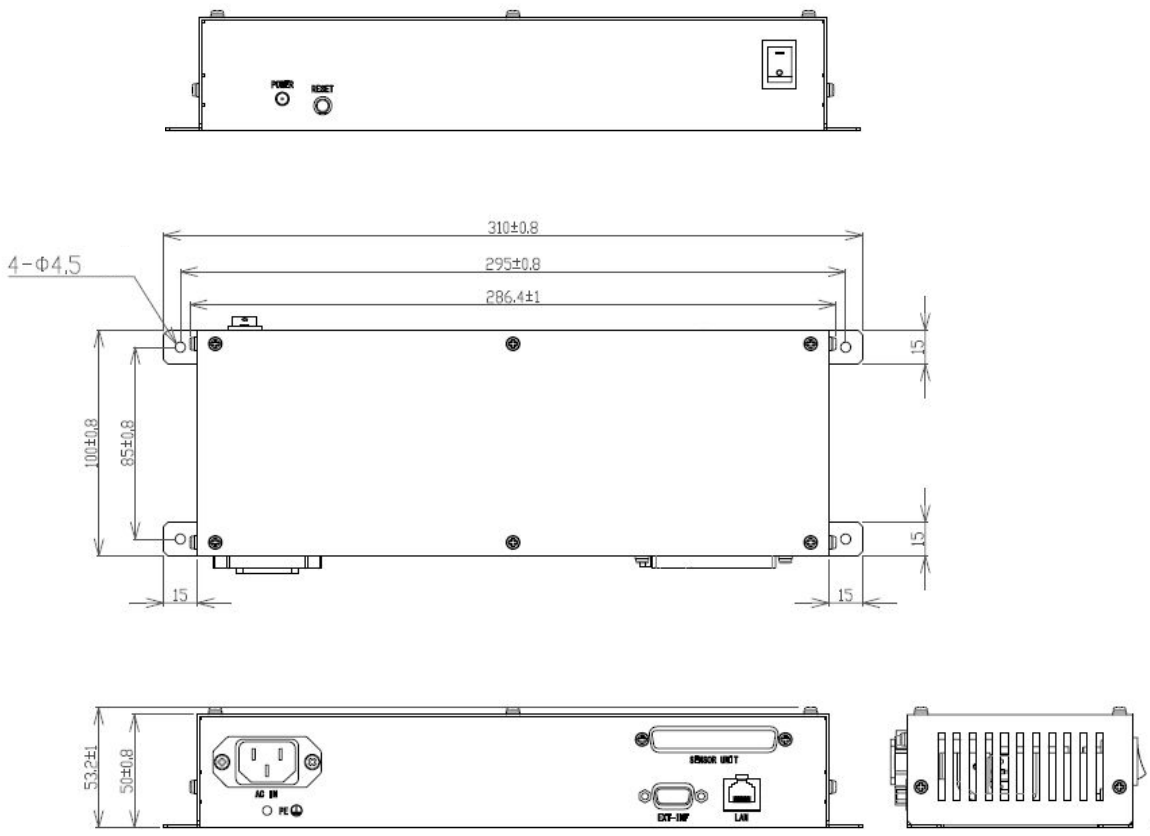
10.2 Interface Box

Unit: mm



10.3 AC cable

For Interface Box: 1.8m

10.4 Ground (GND) cable

3m

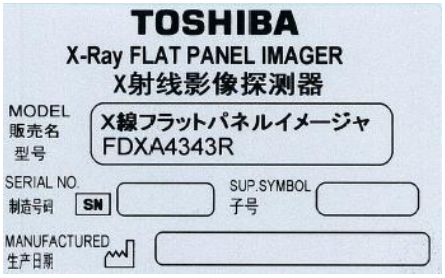
11. WIRING

Please refer to “FDXA4343R Operation Manual”.

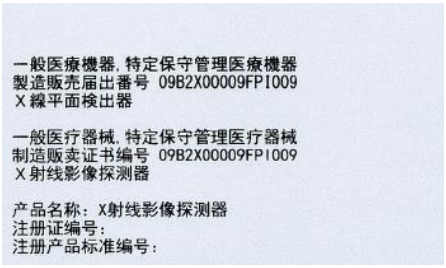
12. LABEL

12.1 Drawing of Labels

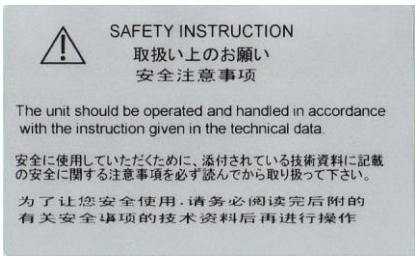
(a)



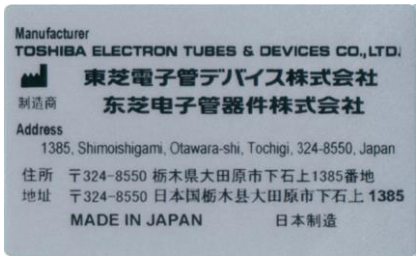
(b)



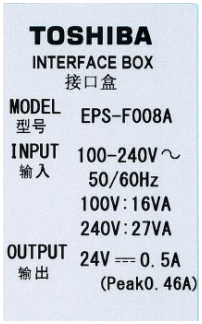
(c)



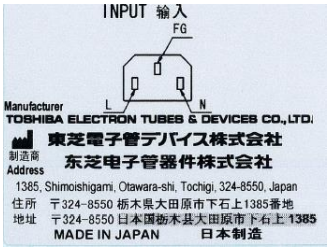
(d)



(e)

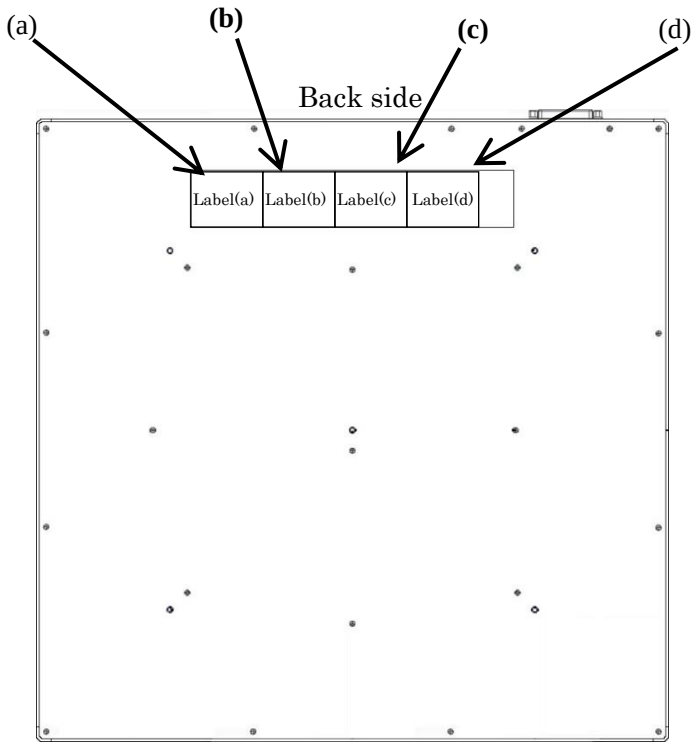


(f)

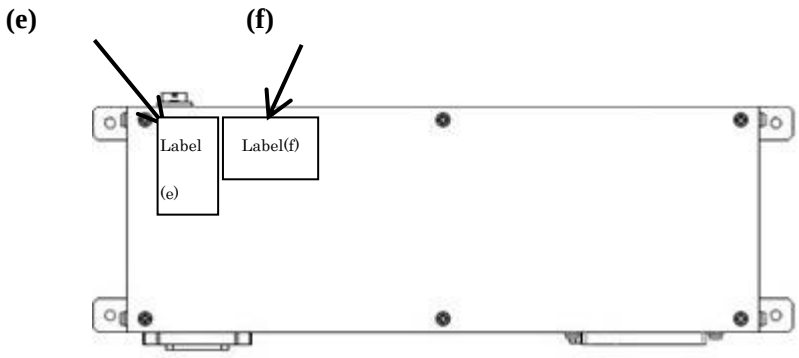


12.2 Labels Position

12.2.1 FPI



12.2.2 Interface Box



13. PERFORMANCE TESTING METHOD AND STANDARDS

Note: All data are measured after image correction by TETD's original viewer application.

(1) Resolution

X-ray condition..... 70kV - 100mA - 5msec, No Aluminum, SID=1m
FPI operation condition ..... Image calibration applied
(Offset correction, Gain correction and Defect correction)
Standard ..... Resolution of chart, which can be, recognize by eye for 1 shot image

(2) Image noise

X-ray condition..... Without X-ray exposure
FPI operation condition ..... Image calibration applied
(Offset correction, Gain correction and Defect correction)
Standard ..... Pixels value of dark image

(3) Defect

X-ray condition..... RQA5
FPI operation condition ..... Image calibration applied
(Offset correction, Gain correction and Defect correction)
Standard ..... Pixels which output below 50% or over 130% value compared with average brightness from effective pixels

(4) MTF

Used chart ..... Corresponding to IEC62220-1
X-ray condition..... RQA5
FPI operation condition .....Image calibration applied
(Offset correction, Gain correction and Defect correction)
Standard ..... MTF value (%) at 2Lp/mm from average of 16 images (at center area)

(5) DQE

X-ray condition..... 0.6mR (RQA5)
FPI operation condition ..... Image calibration applied
(Offset correction, Gain correction and Defect correction)
Standard ..... DQE value (%) at 0 Lp/mm from average of 64 images (at center area)

(6) Maximum input dose

X-ray condition..... 70kV-Aluminium 22mm (RQA5)
FPI operation condition ..... Image calibration applied
(Offset correction, Gain correction and Defect correction)
Standard ..... Maximum input X-ray dose, which satisfies within 5% level of linearity between input dose and output value at center area

14. SERVICE PARTS

Following parts are defined as service parts.

1. Interface Box: Model name - EPS-F008A

15. WARRANTY

15.1 TETD warrants the FPI to be free of manufacturing defects, which will impair their normal operational life during the warranty period, provided that the FPI is used with TETD's instructions and specifications.

15.2 The warranty period extends twenty-four (24) months from the date of the airway bill. If the FPI shall prove to be defective during the warranty period, TETD shall refund the original amount.

15.3 Notification of the claim shall be received by TETD within one (1) month after discovery of failure, filling in TETD's report from. If return of the defective FPI is required by TETD, each return shall be made without delay, and in accordance with TETD instruction.

15.4 The warranty shall not apply to defects resulting from accidents, alterations, abuse, misuse or improper installation.

16. EXPORT CONTROL

16.1 US Export Administration Regulations

This product contains U.S.-origin Component and Technologies.
It may not be transferred, or otherwise disposed of, to any country or to any person restricted under U.S. laws and regulations, without first obtaining approval from the U.S. government or as otherwise authorized by U.S. law and regulations.

16.2 Others

Distribution of the products and/or devices which incorporate the products may require prior approval of or notification to the regulatory authorities and/or the relevant government authorities. When distributing the product, all the laws and/or regulations applicable in the country and/or the region must be observed.

17. DOCUMENTS ATTACHED TO EACH PRODUCT

Documents attached to each product are as follows.

1. Inspection Sheet (FDXA4343R)
2. Technical Data (FDXA4343R)
3. Operation Manual (FDXA4343R)
4. Package Inserts (FDXA4343R)

18. SAFETY PRECAUTIONS AND WARNING

Find this document before using X-Ray FLAT PANEL IMAGER (FPI)

This document describes the attention of equipment manufactures and users to use safety X-Ray FLAT PANEL IMAGER (hereafter called FPI). Please find the technical data sheet of each product and this document “SAFETY PRECAUTIONS AND WARNING” and understand these contents before using FPI. The FPI is used under X-ray exposures. Therefore only the legally qualified person for the X-ray operation may use this device. An engineer with full expertise or a professional service representative must perform installation, adjustment, maintenance, and check. Moreover these documents are always stored and can be seen in operating place. If you have any questions, please contact our local sales representatives for further information.
The FPI present a certain number of potential risks by the very nature of the physical principles included in their manufacture or operation and because of the materials used to make FPI. Therefore equipment manufacturers and users shall take the responsibility by themselves to protect against these risk and respect local safety laws and regulations.

1. Electric Shock

In operating, do not touch the lead wires and connectors of the FPI. If necessary to touch lead wires and connectors, please turn off the power supply and confirm no residual voltage exist before connecting, disconnecting and handling them. The housing of the FPI should always be connected to ground. All ground terminals and ground wires shall be also done to ground.

2. Ground Connection

Connect all protective earth and cables of the FPI to ground. The housing with protective earth should be connected to ground. The resistance between protective earth and ground cables shall be less than 0.1 ohms. The sectional area of the conductor is required for 0.75mm^2 or more.

3. Stop Operation During Abnormal Status

Shut down power supply and contact to sales representatives immediately when the FPI stops operation during abnormal status.

4. Remodeling Electronics Parts

Do not reconstruct FPI electronics parts because it leads to deterioration of images and the cause of malfunctions.

5. Processing of Housing

Do not process FPI housing because it leads to weakness of housing strength and the cause of malfunctions.

6. Screws of Housing

As the screws of FPI housing are tightened by proper torque, do not loosen or remove them.

7. Installing to the Equipment

Installing FPI housing to the equipment by according to the technical data sheet or the specification. It will prevent dropping off of FPI from the equipment.

8. Shipping and Handling

The weight of FPI is mentioned at technical data sheet or the specification. Please take into account on this weight for preventing any dangers during usage.

9. Unnecessary X-ray, Qualified Personnel

The FPI is used combined with X-ray tube assembly. Only Qualified personnel for X-ray handling procedures can use the FPI. For set-ups and services, only knowleged enigineers or special service personnels are able to handle the FPI.

10. X-ray Shield

When using this device, unnecessary X-ray irradiation must be avoided.

(1) Please follow the "minimum distance between the X-ray tube focal point and X-ray incidence plane" and "maximum tube voltage" specified in the technical data.

(2) This devise has X-ray shield only for electronic circuit protection and does not comply with the international safety standard IEC 60601-1-3. Therefore, it requires additional X-ray protection measures for X-ray system to comply with the IEC 60601-1-3.

11. X-ray Specifications

Please follow the ratings below.

(1) Maximum tube voltage …… 150kV
(2) Minimum tube voltage ……40kV
(3) Maximum X-ray incident dose rate…… 8.73 x 10^{-3}Gy/min [1R/min]
(4) Minimum distance between the X-ray tube focal point and X-ray incidence plane.....73cm

12. Stop Operation

A limited operating life and the possibility of random failures are inherent to FPI and shall be taken into account for the protection of personnel and equipment. The operation of FPI under inappropriate conditions, either due to the lack of care or knowledge, can lead to grave risk to the life and limb of personnel, independent of the risk of FPI and/or equipment damage.

13. Contact to Patient and Operator

The FPI does not have an applied part. Install the FPI not to contact or touch the patients and operators.

14. Installation

Be sure to install the FPI not to touch the patients and operators during operation with cover.

15. Mechanical Shock and Vibration

Do not give a mechanical shock or vibration to the FPI housing. It may cause the malfunction of FPI due to break down of TFT panel.
Do not use FPI in car, bus and/or truck. FPI is not designed to be used in such applications.

16. Protection of Input Plate

The FPI input plate consists of a thin carbon plate (CFRP). Therefore it shall never receive shock or pressure. Do not let patients to touch FPI input plate directly.

17. Environmental Temperature, Humidity and Atmosphere (Electromagnetic Waves)

The specified temperature and humidity in operating and storage are described at the technical data sheet and the specification. Moreover, FPI shall not experience large and fast temperature and humidity change. Do not use and set the FPI in an atmosphere of inflammable and/or corrosion gasses. Do not install FPI at around any electromagnetic wave noise sources.

18. Condensation

Do not let FPI in condensation situation at any time. It may cause malfunctions of electronics circuit and deterioration of images.
Do not open inner plastic bag before a sufficient acclimatization time of minimum 8 hours.
If not done accordingly, it may cause condensation.

19. Ingress of Liquid

Do not splash the FPI with any liquid. Occasionally that is a cause of damage.

20. Dust and Particles

Do not use FPI in the environment where dust and particles exist.

⚠ 21. Interface Box

(1) Use the Interface Box attached to FPI.
(2) Do not remodel the Interface Box. Use the power supply as delivered.
(3) Do not drop the Interface Box. If dropped, it may be cause of malfunction. Also, be sure to fix it during operation.
(4) When you use the Interface Box, the input voltage must be restricted within the rating range. In case it is used exceeding the range, it may become a cause of failure, and lead to unusual smell, smoke, fire, etc in worst case.
Please be sure to abide above advices to avoid such an accident.

⚠ 22. Adjustment

The FPI requires adjustment (ex. Gain and image processing calibrations) according to input X-ray conditions. Be sure to start using the FPI with equipment after adjustment. In the case of exchanging X-ray tube assembly or change of X-ray intensity distribution, adjustment of the FPI is necessary.

⚠ 23. Memory

A memory chip is mounted on this device. The memory contents may be cleared due to electrical shock as ESD, Do not apply major stress such as ESD.

⚠ 24. Environment Temperature

Use the FPI under specified temperature conditions. This is in order to prevent deterioration of FPI characteristics and the cause of malfunctions due to lowering cooling availability.

⚠ 25. Temperature Sensor

The FPI is equipped with temperature sensor. Alarm appears when it detects abnormal internal temperature. Stop operating FPI when it appears then check surrounding temperature.

⚠ 26. Cables

Users must use cables attached with the FPI.
Be sure to connect correctly and do not loosen cables.

⚠ 27. Ethernet

Cross type Ethernet cable must be used. Also, do not connect Ethernet cable to common networks, must be directly connected to PC.
Do not disconnect Ethernet connection while DC24V is operating and supplying to FPI.
Do not disconnect cable during operation,
Radiography system should have a protective function which prohibits exposures in the case of LAN cable disconnection between FPI and PC.

28. Fuses

Fuses are installed inside of Interface Box.
Stop immediately using the FPI when fuse breaks.

29. Defects

It is natural due to characteristics of TFT that the FPI has defects. Please calibrates/corrects defects upon usage of FPI. Defects can be corrected by using defect maps.

30. Vibration Noise

Do not apply vibration noise during operation. It may becomes the cause of image deterioration or noise.

31. Service/Maintenance

Service/Maintenance should be carried out periodically according to the technical data sheet or the specification sheets.

32. Shipment

FPI should be removed from equipment then put into polyethylene-type bag equipped with hygroscopic material (same way as delivered) and pack in TETD packing box to be protected. Keep FPI input plate faced upwards during shipment.

33. Scrap

FPI has lead plate for X-ray shielding to prevent from lower image quality due to scattering radiation. The lead powder or vapor is harmful for human health. Dispose the scrapped products according to the requirement of local regulation.

34. Return

Keep the packing with care and they should be used for any shipment.
In case that they are not used for the return and products have any artificial damages, warranty will be voided.

35. Image processing

Appropriate image processing is required for the interpretation of radiogram.
Excessive image processing causes image artifacts which may have adverse effects on the interpretation of radiogram.
Please confirm that the image processing is correct and there is no adverse effect on the interpretation of radiogram. FPI does not include image processing.

⚠ 36. Securement of cyber security

This device is controlled by X-ray system. Therefore, X-ray system side shall take appropriate actions to maintain necessary security level by consistent risk management such as system setting, network security and system management, etc.. Otherwise, it may cause security problems (illegal operation, hacking, data manipulation, information leaking, etc…)

⚠ 37. Automatic X-ray detection function (AED)

(1) The AED may not properly operate in case there is insufficient X-ray amount on the X-ray incidence plane of the FPI.

(1-1) TETD does not take the responsibility on influence to acquired images resulted from a combination of X-ray generator, X-ray quality and image parts.

(1-2) The AED is designed to operate under the following conditions.

X-ray area: More than 5 cm × 5cm at FPD front surface

X-ray dose: More than 2 uGy (RQA5) at FPD front surface

Exposure period: 500 ms as standard (variable between 500 to 4000 ms)

Note that these values are our representative measurement values instead of guaranteed values.

X-ray system suppliers should sufficiently evaluate proper operation of the AED in advance, as penetrating X-ray quality varies depending on X-ray tube, filter and measurement parts.

(1-3) The operating environment of the AED varies depending on not only X-ray amount but also X-ray tube current and radiation range. Thus, the AED may not be operable even under an environment of identical image luminance.

(2) The AED does not operate when it is not set to AED mode.

(2-1) The AED operates only when it is set to AED mode by using the control command. X-ray system suppliers should make setting to provide notices enabling a technician to understand status of the FPI in real time. The system should prohibit X-ray radiation in state other than where FPI is enabled with radiography.

(2-2) Do not power off the FPI and the interface box in AED mode, as otherwise image acquisition might be disabled.

(2-3) The AED does not operate during AED operation or preparation.

(2-4) The AED is limited with duration of X-ray radiation. Set the X-ray pulse width within X-ray radiation time.

(3) Impact, loading or external electric noise might cause erroneous operation of the AED.

(3-1) Do not give impact, loading or electric noise on the FPI in AED mode.

(3-2) The system should be designed such that X-ray radiation starts when FPI's AED mode is ready for operation.

(4) The FPI cannot control X-ray radiation of the X-ray generator. X-ray system suppliers should control X-ray radiation.

19. RECORD OF FDXA4343R SPECIFICATION REVISION

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