QR-DVT 9000

Mod: Newtom 3G

Dental Volumetric Tomograph

Technical Features

Scope:
This document has been intended as an addendum to the User Manual. It includes all the technical characteristics that are not provided with the User Manual.

Technical features

X-Ray source system

X-Ray tube head

Manufacturer	P.S.M. S.r.l.
Model	HF1F
ELECTRICAL DATA	
Maximum power ripple.	<1%
High voltage rising time with the maximum power.	<0.5ms
HIGH VOLTAGE TRANSFORMER	
Inverter manufactured by P.S.M. s.r.l. Mod. HF1 3.5 kW	
Working Frequency	20 kHz
Maximum Input Voltage	350 V
Maximum Input Current	150 A
FILAMENT	
Maximum current (RMS)	900 mA
Coolidge ratio(current)	1:6.2
RX LOADING	
RX Loading (large focus) – 110kV for max 5s	30mA
RX Loading (large focus) – 80kV for max 5s	40mA
RX Loading (large focus) – 40kV for max 5s	65mA
RX Loading (small focus) – 110kV continuos	2mA
RX Loading (small focus) – 110kV Duty Cicle 50%	5mA
OUTPUT SIGNALS	
HV+ (Analogic)	0-5.5 V
HV - (Analogic)	0-5.5 V
I+ (Analogic)	0-10 V

Detector system

X-Ray Image Intensifier (II)

12”

All the characteristics are provided as typical manufacturer’s technical specification, tested and measured for each device

Type	X-Ray image intensifier									
Manufacturer	THALES Thales Electron Devices									
Model	TH 9432 HP H971 VR13 TH 9432 HP H675 VR13									
FOV (Fields Of View)	**12”**			**9”**			**6”**			
Parameters(1)	**Min**	**Typ**	**max**	**Min**	**Typ**	**max**	**Min**	**Typ**	**max**	**UM**
Useful entrance field size	290			210	215	220	155	160	165	mm
Output image size		25.2 ± .2			25.2 ± .2			25.2 ± .2		mm
DQE at 59.5 keV	62	65			65			65		%
Conversion factor (2)	22	28			14			7		cd.m-2 / µGy.s-1
Limiting resolution (3) *- center* *- 70 % radius* *- 93 % radius*	 38 38 34	 46 42 38		 44 44 42	 50 48 46		 50 50 48	 56 54 52		 lp/cm lp/cm lp/cm
MTF : (at center) (3) *- 2 lp/cm* *- 5 lp/cm* *- 10 lp/cm* *- 20 lp/cm*		 91 79 55 22			 92 82 60 28			 94 86 67 35		 % % % %
Low frequency drop (LFD) (3)		7			6			5		%
Contrast ratio (3) *- 10 % disk* *- 10 mm disk*	 18 25	 11 15		 22 25	 13 14		 20 30	 12 17		
Brightness non uniformity (2)		20	25		15	20		10	15	%
Integral distortion (2) - 90 % radius		8	10		5			3		%
Differential distortion (2) *- 50 % radius* *- 70 % radius* *- 90 % radius*		 5 15 30	 10 20 35		 12			 6		 % % %

(1): All characteristics measured according to IEC Standards 1262-1 to 7
(2): radiation quality: 22.5 mm Al total filtration; 7 mm Al 1st HVL (~75 kVp)
(3): radiation quality: 2.5 mm Al total filtration; 50 kVp

9”

All the characteristics are provided as typical manufacturer’s technical specification, tested and measured for each device

Type	X-Ray image intensifier									
Manufacturer	THALES Thales Electron Devices									
Model	TH 9428 HP2H931 VR13									
FOV (Fields Of View)	**9”**			**6”**			**4”**			
Parameters(4)	**Min**	**Typ**	**max**	**Min**	**Typ**	**max**	**Min**	**Typ**	**max**	**UM**
Useful entrance field size	215			155	160	165	115	120	125	mm
Output image size		20.0± 0.2			20.0±0.2			20.0± 0.2		mm
DQE at 59.5 keV	62	65			65			65		%
Conversion factor (5)	180 20	240 28			120 14			60 7		cd.m-2 / µGy.s-1
Limiting resolution (6) *- center* *- 70 % radius* *- 93 % radius*	 42 40 38	 48 44 42		 52 48 46	 56 52 50		 56 52 50	 64 58 54		 lp/cm lp/cm lp/cm
MTF : (at center) (6) *- 2 lp/cm* *- 5 lp/cm* *- 10 lp/cm* *- 20 lp/cm*		 92 83 60 25			 93 85 65 30			 94 87 70 40		 % % % %
Low frequency drop (LFD) (6)		7			6			5		%
Contrast ratio (6) *- 10 % disk* *- 10 mm disk*	 19 14	 23 16		 20 15	 25 18		 25 16	 30 20		
Brightness non uniformity (5)		20	25		10	15		5	10	%
Integral distortion (5) - 90 % radius		4	6		2			1		%
Differential distortion (5) *- 50 % radius* *- 70 % radius* *- 90 % radius*		 4 9 15	 7 14 20		 6			 3		 % % %

(4): All characteristics measured according to IEC Standards 1262-1 to 7
(5): radiation quality: 22.5 mm Al total filtration; 7 mm Al 1st HVL (~75 kVp)
(6): radiation quality: 2.5 mm Al total filtration; 50 kVp

Flat Panel Imager (FP)

9.6" x 7.68"

All the characteristics are provided as typical manufacturer's technical specification, tested and measured for each device

Type	Amorphous Silicon Digital X-Ray Detector
Manufacturer	Varian Medical Systems
Model	PaxScan 2520
Conversion Screen	Cesium Iodide
Pixel Area	Total: 19.5 (h) x 24.4 (v) cm (7.68 x 9.6 in) Active: 17.9 (h) x 23.8 (v) cm (7.05 x 9.38 in)
Pixel Matrix	Total: 1,536 (h) x 1,920 (v) Active: 1,408 (h) x 1,888 (v)
Pixel Pitch	127 um^2
Limiting Resolution	3.94 lp/mm at 5 frames per second 1.97 lp/mm at 25/30 fps
MTF, X-Ray	$\geq$ 35% 2 lp/mm with standard screen at 80 kVp
Energy Range	40 - 150 kVp
Dynamic Range	$\geq$ 2000:1
Scan Method	Progressive, unidirectional
Data Output	High-speed serial, twisted pair
A/D Conversion	12-bits $\pm$ 1/2 LSB integral linearity
Frame Rate	1 fps - 30 fps
Temperature Range	10-30ºC case temperature.
Maximum Entrance Dose	1 mR
Size cm (inches)	26.67 x 31.75 (10.5 x12.5)
Weight	5 kg (11 lb)

CCD camera

Only on II based detectors. All the characteristics are provided as typical manufacturer's technical specification

Manufacturer	QR S.r.l.	
Model	M-k^2-1240-30 (progressive scan CCD)	
Imaging device	Progressive scan CCD	
Pixels	1024X1024	
Pixel size	7.4X7.4	µm
Pixel depth	12	bit
S/N	66	dB
Frame rate Max	30	F/s
Frame rate Used	10	F/s
Data transfer to computer… via	Optical Fiber	
Data transfer rate	1	GHz

Images data

Scout view radiological images

II based detectors

Image pixels	1000x1000	Pixels
Pixel depth	12	n.
Pixel size (II, 12" FOV)	0.22 x 0.22	mm
Pixel size (II, 9" FOV)	0.15 x 0.15	mm
Pixel size (II, 6" FOV)	0.11 x 0.11	mm

FP based detectors

Image pixels	960 x 768	Pixels
Pixel depth	12	n.
Pixel Size (FP, 9,6" x 7.68" FOV)	0.17 x 0.17	mm

Reconstructed volume

II based detectors

Shape	Sphere	
Maximum diameter (II, 12" FOV)	190	mm
Maximum diameter (II, 9" FOV)	140	mm
Maximum diameter (II, 6" FOV)	100	mm
Voxel size (II, 12" FOV)	0.42	mm³
Voxel size (II, 9" FOV)	0.29	mm³

Voxel size (II, 6" FOV)	0.21	mm^3

FP based detectors

Shape	Cilinder	
Maximum diameter (FP, 9,6" x 7.68" FOV)	160	mm
Voxel Size (FP, 9,6" x 7.68" FOV)	0.32	mm^3

Reconstructed image: reconstructed volume slices

Shape (volume slice)	Depending on the section surface	
Image pixels	512 x 512	Pixels
Pixel depth	16	bit
Displayed pixel depth	8	bit
Pixel size (12" FOV)	0.42	mm^2
Pixel size (9" FOV)	0.29	mm^2
Pixel size (6" FOV)	0.21	mm^2
Pixel Size (FP, 9,6" x 7.68" FOV)	0.32	mm^2

Performances

Spatial resolution	See "User Manual"
Geometrical accuracy	Min. 0.8% - Max 2.2%

Safety

According to IEC standards
Device for radiological safety (smart-beam): system regulating the intensity of the x-ray beam depending on the density of the interested tissues.
Device for radiological safety (safe-scan): device that automatically interrupts the x-ray emission in case of computer freezing or crash