Product Data

ROTOGRAPH evo 3D

Digital Panoramic / Cephalometric / 3D X- Ray unit

General Features

Movement technology:	multi-motor with digital trajectory control
Patient alignment:	through two laser pointers that allow to locate the reference planes: mid-sagittal, Frankfurt/Camper
3D Technology:	CBCT Cone Beam Computed Tomography

Standard Examination Programs

- **Adult panoramic**
- **Child panoramic** with reduction of exposure parameters
- **TMJ open/close mouth:** 4 slices are taken on the same image: left/right condyle, open/close mouth. Condyles are examined in lateral projection
- **Maxillary Sinus P-A**: one P-A projection, where both the maxillary sinuses are represented.

In every program the compensation of spinal column is obtained by means of parameters modulation, optimized in function of the anatomic program

Standard Evo 3D Programs

- **Full Dentition:** Dentition volumetric exam allows to obtain a full view of the patient dentition
- **TMJ Right:** TMJ Right exam in 3D modality allows to have a clear perspective of the right condyle and of its position in the mandibularis fossa .
- **TMJ Left:** TMJ Left exam in 3D modality allows to have a clear perspective of the left condyle and of its position in the mandibularis fossa .
- **Sinus**: images taken in 3D modality allows to have a full perspective of sinus area

Optional "Evo XP eXtended Programs"

- **Adult half-panoramic** (right and left)
- **Child half-panoramic** (right and left)
- **Improved orthogonality dentition**: panoramic projection limited to the dentition obtained with X-ray beam constantly perpendicular to the arch. It allows to reduce superimposition of adjacent teeth and to improve visualization of possible interproximal caries.
- **Frontal dentition**: panoramic limited to the frontal dentition (canine to canine), allowing to improve the detail definition on incisors.
- **Low dose panoramic**: panoramic with reduced angle of rotation to exclude the ascending ramus from the image. The result is a panoramic limited to the dentition area, with a reduced patient dose.

Optional Digital Cephalometric

In case of digital ceph mounted on board, the unit will be equipped with a cephalometric arm with a dedicated sensor not requiring sensor repositioning to switch from pan to ceph exam. Sensor length: 22 cm.

The digital cephalometry is based on a linear scanning technique, obtained maintaining the focus in a fixed position, guaranteeing the same projection geometry as if using film.
The x-ray source is automatically aligned to digital sensor.

Ceph exams can be executed in two modalities, selectable from console:

- high resolution (2x2 binning), for the enhancement of the finest details
- high speed (3x3 binning), for patient dose reduction and for the decrease of artifacts due to possible patients movements.

Adjustable soft tissue filter enhances profile of the soft tissues of the face on the lateral skull view.

The system allows the following projections:

Application	Images formats	Scanning time (High resolution 2x2 binning)	Scanning time (High speed 3x3 binning)
Skull Latero-Lateral	22 x18 cm vertical asymmetric	9 s	4.5 s
Skull Latero-Lateral, with full view of the nape	22 x 24 cm horizontal asymmetric	12 s	6 s
Skull mainly Latero-Lateral. Can also be used for AP/PA projections	22 x 30 cm horizontal asymmetric	15 s	7.5 s
Skull Antero/Posterior or Postero/Anterior	22 x 24 cm vertical symmetric	12 s	6 s
Hand/wrist examination	22 x 18 cm vertical symmetric	4.5 s	----

Anatomic Programs

- Patient type: 2 choices: adult, child
- Patient size: 3 choices: small, medium, large
- Arch shape: 3 choices: standard, protrusive, retrusive

Image Magnification

- Panoramic 1.28 constant
- Open/close mouth TMJ 1.25 average
- Sinus 1.27 average
- Cephalometry 1.10 in the mid-sagittal plane in LL projection

Note: the magnification factor is calculated in the center of the focal layer, which is based on a shape of the mouth-ascending ramus complex, as defined in international literature.

Patient Positioning

Patient positioning is assured through multiple references

- Temple clamps centering device
- 5 types of chin support:
  - standard with bite stick,
  - reduced height with bite stick,
  - for edentulous patients,
  - for ATM
  - for Sinus exams,
  - for 3D TMJ
- Two laser pointers that allow to locate the reference planes: mid-sagittal, Frankfurt/Camper
- One mirror for the frontal patient view
- Communication of protrusion degree through key-board selection, without patient movement

Generator

- High frequency generator, constant potential
- Ripple: < 4%
- High frequency: 200 kHz
- High voltage: 60 ÷ 86kVp, 2 kV steps
- Anodic current: 6 ÷ 12mA, step 1 mA for cephalometry
  6 ÷ 10mA, step 1 mA for other exams
- Standards Exposure times:
  - Panoramic: 13.8 s adult/child
  - Hemipanoramic: 7.4 s adult, 7.3 s child
  - Open/close mouth TMJ: 4 x 2.44 s (total 9.7 s)
  - Maxillary sinus P-A: 9.4 s
  - Improved orthogonality dentition: 11.9 s adult/child
  - Frontal dentition: 4.4 s
  - Low dose panoramic: 11.4 s
- 3D Exposure times (pulsed emission):
  - Full Dentition: 8 s
  - TMJ Right 7.2 s
  - TMJ Left 7.2 s
  - Sinus 8 s
- 3D Exam total times:
  - Full Dentition: 20 s
  - TMJ Right 18 s
  - TMJ Left 18 s
  - Sinus 20 s

X-ray Tube

- Focal spot size: 0.5 (EN 60336)
- Heat storage capacity: 30kJ (40kHU)
- Total filtration: 2.5mm Al eq.
- Duty cycle: Adaptive Duty Cycle according to exposure factors.From 1:8 (at 60kV, 6mA) up to 1:20 (at 76kV, 12mA).Further reduction for the first three exposures: from 1:3.6 (at 60kV, 6mA) up to 1:9 (at 76kV, 12mA).

Automatic Collimator

- Primary collimator with motorized operation, automatic selection of 3 diaphragms:
  - panoramic exams
  - cephalometric exams
  - volumetric exams
- Secondary collimator on the Ceph arm to reduce scattered radiation.
- Soft tissue filter enhances profile of the soft tissues of the face on the lateral skull view. Motorized positioning of the filter can be adjusted to match the contour of any patient

Accessories

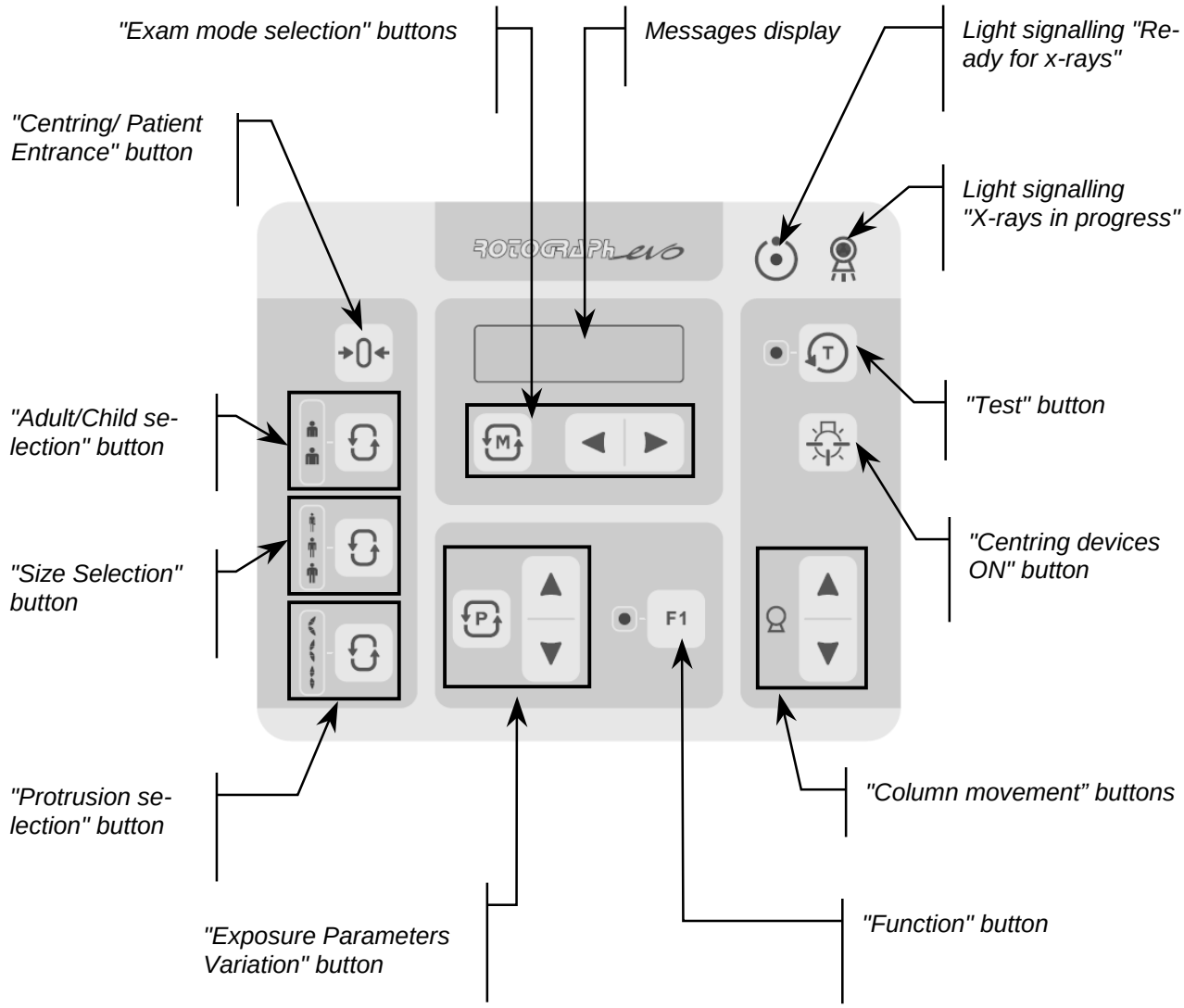
- Standard chin support with bite stick (standard)
- Reduced height chin support (standard)
- Chin support for edentulous patients (standard)
- Reduced height support for TMJ and Sinus (standard)
- Chin support for 3D TMJ
- 10 bites (standard)
- Head rest (standard)
- X-ray push button with extensible cable (standard)
- 10 ear centring pins for ceph (standard)
- Disposable byte protective sleeves (optional)
- 10 disposable head strips for 3D exams (standard)

User Interface

Console with flat and waterproof surface for easy cleaning and disinfecting

- Alphanumeric "OLED" Display of 2 lines of 20 characters
- X-ray push button with extensible cable
- Every operation is guided by messages shown on the display
- Selectable languages: italian, english, french, spanish, german, Turkish, Portuguese, Dutch

Keyboard Functions



Digital Acquisition System

PAN + 3D Sensor

- Technology: Amorphous Silicon Flat Panel with Cesium Iodide (CsI) scintillator
- Active area: 130x130 mm
- Pixel size: 127 µm
- Voxel size 166 µm (2x2 binning)
- Detector matrix: 1024x1024
- Reconstructed volume dimension 85x85mm (diameter x height)
- Grey levels: 4096 (14 bit)
- Rotation angle 3D: 200°
- Projection number: 200
- Reconstruction time: 18s (40s with metal artifact algorithm)
- Axial layer thickness: 166/332/664 µm
- PAN image size: 130x130mm
- PAN image matrix: 1024x2300

CEPH CCD Sensor

- Technology: CCD sensor with Cesium Iodide (CsI) scintillator screen
- Sensor size: 6x220 mm
- Pixel size: 48 µm (96 µm in 2x2 binning; 144 µm in 3x3 binning)
- Sensor resolution: 5.2 lp/mm (in high resolution modality - 2x2 binning)
  3.4 lp/mm (in high speed modality – 3x3 binning)
- Gray levels: 4096 (12 bits) in acquisition (A/D converter)
- Scanning: horizontal, with constant speed:
  20 mm/sec (binning 2x2)
  40 mm/sec (binning 3x3)
- Max useful image size: equivalent to a 24x30 cm film

Image Acquisition

Rotograph EVO D allows to acquire digital images **through Giga-Ethernet connection**: the images and the exposure parameters are transferred from Rotograph EVO D to the PC via Giga-Ethernet connection. The images are seen forming on-screen in *real time* during the exposure.

Dental Studio Software 3D Module

Rotograph EVO 3D is always equipped with Dental Studio software (see dedicated product data for specific details).

Dental Studio 3D software allows to:

- Display in the same window:
  - axial images
  - 3D reconstructions
  - cross sections
  - panoramic image reconstruction from panoramic arc edited by the user
- Use note and measurements tools
  - Measure of single and multiple segments
  - Areas measure
  - Angles measure
  - Distance measure between parallel lines
  - Mean, standard deviation and regression values calculation in a region of interest
  - Insertion of arrows of variable length on the image
  - Insertion of free notes of variable length on the image
- Apply pre-set LUT adjustment
  - Standard
  - Bones and tissues
  - Bones only
- Apply smooth filter on panoramic plane
- Modify cross section width
- Modify axial images
- Create patient reports with customized selection of:
  - Axial images
  - Cross sections
  - Panoramic reconstructions
  - 3D view from different perspectives
  - Screenshots
  -

PC technical specifications

• CPU:	Intel® Core™ i5-750 (2.66GHz, 8MB L3, 95W,Quad Core)
• RAM:	4Gb
• Hard Disk:	1TB
• Operative system:	Windows 7 (32bit)
• Video card	512MB PCIe x16 NVIDIA Quadro FX 580 (2xDP+DVI or DP+2xDVI or DP+DVI+VGA)
• Monitor:	19” LCD, 16:9 widescreen, 300 cd/m^2 , 1440x900 resolution, 1000:1 contrast

Mechanical Characteristics

- Source to image distance: 520 mm (20,4”) for panoramic, TMJ and Sinus
  1650 mm (65”) for ceph
- Vertical column movement: 850 mm (33,5”). Motorized column double speed
- Weight
  - Version without ceph arm: 161kg (354 lb); 191 kg (411 lb) for floor mount
  - Version with ceph arm: 186kg (409 lb); 216 kg (475 lb) for floor mount
- Total height max: 2450mm (96,4”)
- Room size:
  - Version without ceph arm: minimum 1300 x 1200 mm (52” x 47,2”)
    recommended 1300 x 1400 mm (51.2” x 55,1”)
  - Version with ceph arm: minimum 1450 x 2000 mm (57” x 78,7”)
    recommended 1600 x 2200 mm (63” x 86,6”)
- Type of installation: wall or floor mount

Electrical Characteristics

- Power supply voltage: 220-240 V (±10%) single phase
- Frequency: 50/60 Hz
- Current rating: 6,6 A @ 230V
- Power rating: 1,5 kVA

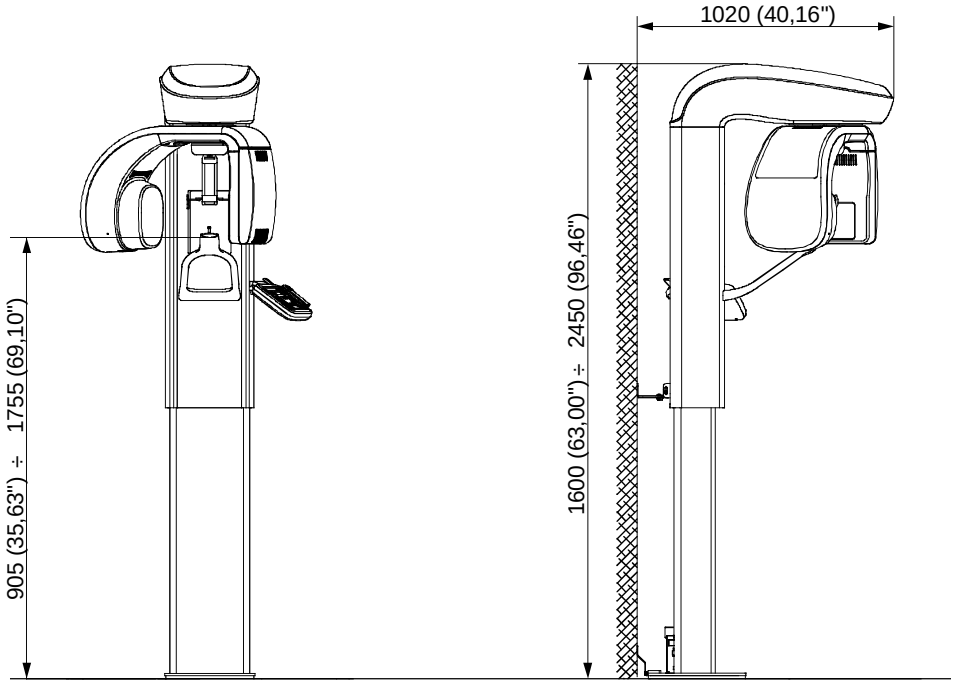
Environmental Characteristics

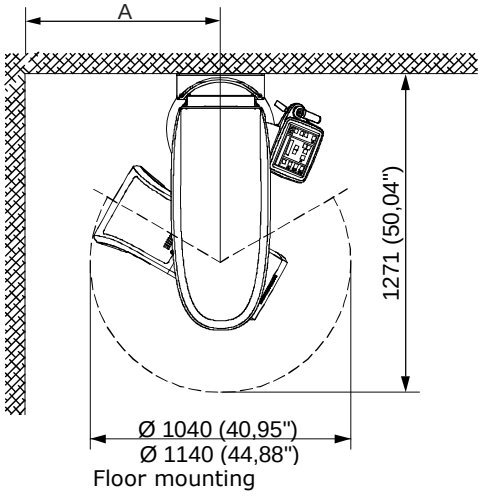
Operating temperature	+10°C ÷ +40°C
Operating relative humidity	30% ÷ 75%
Transport and storage temperature	-20°C ÷ +70°C
Transport and storage relative humidity	<90 % not condensating
Transport and storage atmospheric pressure	>630 hPa

Standards and Regulations

CE 0051	CE symbol grants the product compliance to the European Directive for Medical Devices 93/42, as amended by European Directive 2007/47/EC, as a class IIB device

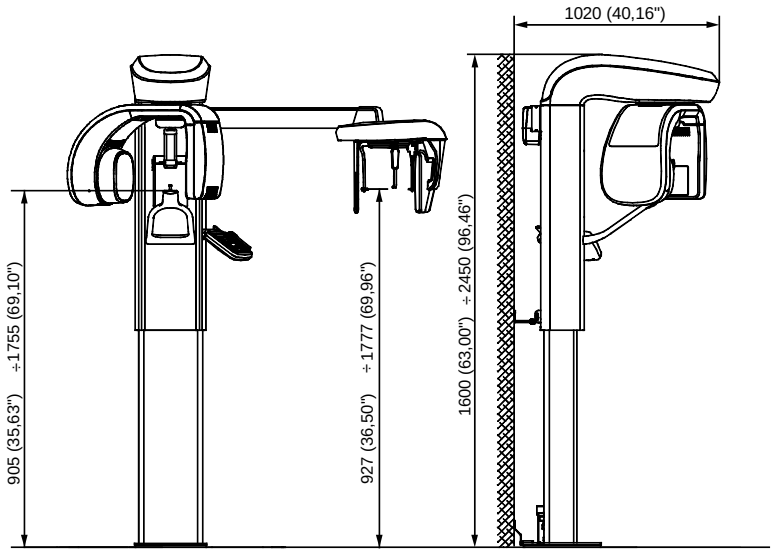
Dimensions Pan version (all quotes in mm and inches)

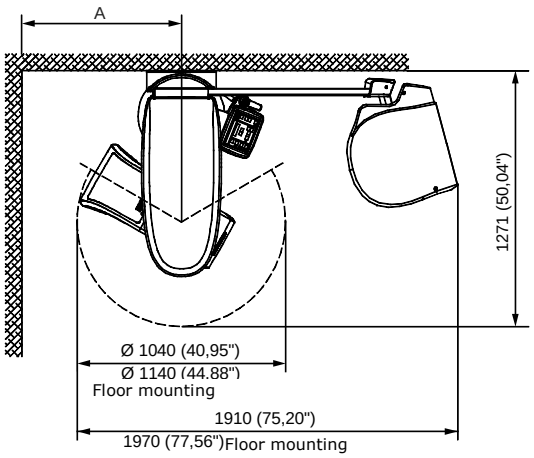




A= minimum 600 mm (23,6”), suggested 800 mm (31,5”)

Dimensions Ceph version (all quotes in mm and inches)





A= minimum 600 mm , suggested 800 mm

Note: Products are continuously under review in the light of technical advancement. The actual specification may therefore be subject to improvement or modification without notice.

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