

Voluson E8 Expert BT12

Datasheet

Product description

The Voluson® E8 Expert BT12 is an advanced imaging platform that combines extraordinary image quality with our superb volume ultrasound technology.

Highlights

- High Resolution Flat Panel Display 19"
- Advanced 4D
- Dynamic Render Engine 2nd Generation
- Advanced VCI with OmniView
- SonoAVC™ *follicle*
- SonoVCAD™ *heart*
- SonoVCAD™ *labor*
- Advanced STIC
- Advanced Fetal Echo
- Wide Sector
- Scan Assistant
- SonoNT
- Elastography (not available in all countries)
- Coded Contrast Imaging (not available in all countries)
- Anatomical M-Mode
- B-Flow
- SonoRender Start
- Matrix Array Volume Technology
- High Performance Transvaginal Probe
- Electrical Height Adjustment
- Floating User Interface
- On Board Archive including Preview and Pre selection



General specifications

Dimensions and Weight

| | |
|-------------------------|-------------------|
| Height (maximum) | 1393 mm (54.8 in) |
| Adjustable | +190 mm (7.48 in) |
| Width | 580 mm (22.8 in) |
| Depth | 930 mm (36.6 in) |
| Weight (no Peripherals) | 131 kg (289 lb) |

Electrical Power

| | |
|---------------------------------|---------------------------|
| Voltage | 100, 115-130, 220-240 VAC |
| Frequency | 50/60 Hz (+/-2%) |
| Power with on-board Peripherals | Max. 1000 VA |
| Thermal Output | 3446 BTU/h |

Console Design

| | |
|---|--|
| 4 Active Probe Ports | 3 plus 1 non-imaging port |
| Integrated HDD | 500 GB |
| Integrated DVD+/-R(W)/CD-R(W) drive | |
| Integrated DVR (Optional) | |
| On-board storage for Peripherals | |
| Wheels | Wheel diameter 150 mm, all 4 wheels independent steer, plus steer lock for portability |
| Integrated locking mechanism that provides rolling lock | |
| Integrated cable management | |
| Front and rear handles | |

User Interface

Operator Keyboard

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|---|
| Floating Keyboard: Rotation: adjustable +/- 40° from center Height adjustable + 200mm |
| Full-sized, backlit alphanumeric keyboard |
| Ergonomic hard key layout |
| Interactive back-lighting |
| Integrated recording keys for remote control of up to 4 Peripherals or DICOM devices, one dedicated DVD recording key |

Touch Screen

| |
|--|
| 10.4 in High Resolution color LCD screen |
| Interactive dynamic software menu |
| Brightness adjustable |

Monitor

| |
|---|
| 19 in High Res LCD monitor with DVI interface |
| Resolution SXGA 1280 x 1024 pixel |
| High brightness with 350 cd/m ² |
| Tilt/Rotate Adjustable Monitor Tilt Angle: + 10°/- 90° |
| Hor. rotate Angle: +/- 115° |
| Digital brightness and contrast adjustment. OSD, remote controlled by the system. Three default settings: Dark Room, Semi Dark Room, Bright Room. |

System Overview

Applications

| |
|-----------------|
| Abdominal |
| Obstetrical |
| Gynecological |
| Small parts |
| Vascular |
| Pediatric |
| Urology |
| Cardiology |
| Neurology |
| Musculoskeletal |

Operating Modes

| |
|--|
| Brightness Mode (B-Mode) (2D) |
| Motion Mode – M-Mode |
| Anatomical M-Mode (AMM) |
| Pulsed wave Doppler (PW) with HPRF |
| Continuous Wave Doppler Imaging (CW) |
| Color Flow Doppler Mode (CFM) |
| Power Doppler Mode (PD) |
| High Definition power Doppler (HD-Flow™) |
| Tissue Doppler Mode (TD) |
| B-Flow (BF) |
| Elastography (Not available in all Countries) |
| Contrast Agent Mode (Not available in all Countries) |
| Combination modes: M/CF, M/HDFlow, M/TD |
| Volume Mode (3D/4D): |
| • 3D Static |
| • 4D Real Time |
| • VCI-A |
| • VCI-OmniView |
| • Spatio-Temporal Image Correlation (STIC), STIC/HD-Flow, STIC/Contrast, STIC/B-Flow |
| • 4D Biopsy |

System overview *(cont.)*

Scanning methods

Electronic Sector
Electronic Convex
Electronic Linear
Mechanic Volume Sweep

Transducer types

Sector Array
Convex Array
Microconvex Array
Linear Array
Active Matrix Convex Array (1.25, 1.5D)
Active Matrix Linear Array (1.25, 1.5D)
Volume probes `4D`:
• Convex Array
• Microconvex Array
• Active Matrix Convex Array (1.25, 1.5D)
• Active Matrix Linear Array (1.25, 1.5D)
• Linear Array
Pencil Probes (CW)

System standard features

State-of-the-art user interface with high resolution 10.4 in LCD touch panel
Automatic Tissue Optimization
Coded Harmonic Imaging with Pulse Inversion Technology
Coded Excitation (CE)
HD-Flow
B-Flow
Tissue Doppler
XTD
SRI II (Speckle reduction imaging)
CrossXBeam^{CRITM} (Compound Resolution Imaging^{CRITM})
SonoNT
SonoRender Start
Scan Assistant
DICOMTM
Static 3D Mode:
• B Mode only • B + CRI + CFM
• B + Power Doppler Mod • B + CRI + PD
• B + CFM Doppler Mod • B + CRI + HD-Flow
• B + HD-Flow Mod • B + B-Flow
• B + CR
Focus and Frequency Composite (FFC)
High Resolution Zoom
Pan Zoom
Steering
Virtual Convex
Wide Sector
BetaView

Patient information database
Image Archive on hard drive
3D/4D data compression (lossy/lossless)
Inversion
Real-time automatic Doppler calcs
Measurement and Calculations including Worksheets/Report for:
• OB • Small-Parts
• GYN • Urology
• Vascular • Pediatrics
• Cardio • MSK
• Abdominal • Neurology
Multigestational Calculations
VOCAL II
Advanced 4D
SonoVCADTM *heart*
Advanced STIC:
• STIC • STIC + CRI + CFM
• STIC + Power Doppler Mode • STIC + CRI + PD
• STIC + CFM Doppler Mode • STIC + CRI + HD-Flow
• STIC + HD-Flow Mode • STIC + B-Flow
• STIC + CRI • STIC M-Mode
STIC^{flow}

System options

VOCAL II
Advanced VCI (Volume Contrast Imaging)
SonoVCADTM *labor*
CW Doppler (Hardware Option)
Elastography (not available in all countries)
SonoAVCTM
Coded Contrast Imaging (not available in all countries)
Foot Switch, with programmable functionality

Peripheral options

Integrated printers:
• B&W thermal printer
• Color thermal printer
DVD Recorder
External Color desktop printer & connection kits
32" wall mountable monitor

System overview *(cont.)*

Display modes

| | | | | | | | | | | | | | | |
|--|--------------------------------|----------------------------------|---|-----------------------------------|---------------|--|--|-----------------|------------------|----------------|----------------|-------------------|------------------|----------------------|
| Simultaneous Capability in combination with SRI and/or CRI: <ul style="list-style-type: none">• B+PW• B+CFM, B+PD, B+TD, B+HD-Flow• B+M, B+AMM• B+3D, B+4D• B+CRI• B+SRI• B+CRI+SRI• Contrast+SRI• B+CRI/3D+CRI• B+SRI/3D+SRI• B+CRI+SRI/3D+CRI+SRI• B+CRI/4D+CRI• B+SRI/4D+SRI• B+CRI+SRI/4D+CRI+SRI• B+CRI/STIC+CRI | • B+SRI/STIC+SRI | • B+CRI+SRI/STIC+CRI+SRI | • B/B+CRI | • B/B+SRI | • B/B+SRI+CRI | • B/CFM+CRI | • B/CFM+SRI | • B/CFM+CRI+SRI | • B/PD+CRI | • B/PD+SRI | • B/PD+CRI+SRI | • B/HD-Flow + CRI | • B/HD-Flow +SRI | • B/HD-Flow +CRI+SRI |
| Real-time Triplex Mode <ul style="list-style-type: none">• B/CFM/PW• B/PD/PW• B/HD-Flow/PW | | | | | | | | | | | | | | |
| Selectable alternating Modes <ul style="list-style-type: none">• B+PW or CW• B/CFM+PW or CW• B/PD+PW or CW | • B/HD-Flow+PW or CW | • B+CFM or PD or HD-Flow or CW | | | | | | | | | | | | |
| Multi-image (split, quad) <ul style="list-style-type: none">• Live and/or frozen• Split: B+B, B/CFM + B/CFM, or B/PD + B/PD or B/TD + B/TD or B/HD-Flow + B/HD-Flow or BF+BF, Contrast + Contrast• Split simultan: B+B/CFM or B+B/PD or B+B/HD-Flow• Split: B+PW or M or CW• Split: Frame Review / XTD-View• Quad: B+B+B+B or BF, B/CFM+B/CFM+B/CFM +B/CFM or B/PD or B/TD or B/HD-Flow• Independent Cine playback• Quad: A+B+C+3D or 4D• Quad: A+B+C+3D or 4D | | | | | | | | | | | | | | |
| <ul style="list-style-type: none">• TUI: 1x1, 1x2, 2x2, 3x2,3x3, 3x4, 4x4• Segmentation: quad (A/B/C/Segm. Object), single (Segm. Object)• Split: TUI Overview + 1 slice | | | | | | | | | | | | | | |
| Zoom Read/Write (with or without overview image) | | | | | | | | | | | | | | |
| Colorized Image <ul style="list-style-type: none">• Colorized B• Colorized M | • Colorized PW | • Colorized 3D | | | | | | | | | | | | |
| Time line display <ul style="list-style-type: none">• Independent Dual B/PW Display• Display Formats: Top/ Bottom selectable format (Size: 1/2:1/2; 1/3:2/3; 2/3:1/3) | | | | | | | | | | | | | | |
| Secondary patient ID (Citizen Service Number) | Accession #: max 16 characters | Hospital Name: max 30 Characters | Sonographer (up to 5 characters are displayed depending on font size) | Gestational age (OB) or LMP (GYN) | Birth date | Date: 3 Types selectable: <ul style="list-style-type: none">• MM/DD/YYYY• DD/MM/YYYY• YYYY/MM/DD | Time: 2 types selectable: <ul style="list-style-type: none">• 24 hours• 12 hours | Probe Name | Application Name | Gray Scale bar | Depth Scale | Focal Zone Marker | Frame Rate | Zoom Start/Depth |
| | | | | | | B-Mode: <ul style="list-style-type: none">• User program• Receiver Frequency• Acoustic Power• Gain• Dynamic Control• Gray Map | <ul style="list-style-type: none">• Edge Enhance• Persistence• SRI, CRI• Focal Zone Markers• Depth Scale Marker• Probe Orientation | | | | | | | |
| | | | | | | M-Mode/ AMM-Mode: <ul style="list-style-type: none">• Gain• Dynamic Control• Edge Enhance | <ul style="list-style-type: none">• Reject• M-Cursor, AMM-Cursor• Time Scale | | | | | | | |
| | | | | | | Doppler Mode: <ul style="list-style-type: none">• Acoustic Power• Gain• Angle• Sample Volume Depth and Width• Wall Motion Filter | <ul style="list-style-type: none">• Velocity or Frequency Scale• Spectrum Inversion• Time Scale• PRF• HPRF• Doppler Frequency | | | | | | | |
| | | | | | | Color Flow Imaging Modes (CFM, PD, TD, HD-Flow): <ul style="list-style-type: none">• Acoustic Power• Color Gain• Color Balance• Color Balance Marker• Quality• Wall Motion Filter• PRF | <ul style="list-style-type: none">• Color Map• Color Scale: kHz, cm/s, m/s• Power and Symmetrical Velocity Imaging• Color Velocity Range• Spectrum Inversion | | | | | | | |

Display annotation

| |
|--|
| Patient Name: <ul style="list-style-type: none">• Last: max 32 characters• First: max 15 characters• Middle: max 15 characters |
| ID: max 32 characters |

System overview *(cont.)*

Display annotation *(cont.)*

3D/4D Mode:

- 3D/4D Sub Program
- Threshold
- Quality
- Volume Box Angle
- Mix
- Acquisition Mode
- Compression
- Orientation Markers
- TUI.: slice distance (0.5-10mm)
- TUI.: slice position in overview image
- SonoVCAD^{heart} and SonoVCAD^{labor}
- SonoAVC™

Elastography Mode:

- Acoustic Output
- Tx Frequency
- Transparency
- Elasto Map
- Persistence
- Line Density

Velocity Range

TGC Curve

Cine Frame Number

Recorder Status

Body Pattern: 117 types organized in 10 anatomical groups

Measurement Results

Displayed Acoustic Output:

- TIS: Thermal Index Soft Tissue
- TIC: Thermal Index Cranial (Bone)
- TIB: Thermal Index Bone
- MI: Mechanical Index

• Power output

• Biopsy Guide Line

• ECG Line

• Trackball function (Trackball and Trackball buttons)

• GE Logo

• Zoom overview image (zoom box position)

System Parameters

System Setup

Pre-programmable Categories date format.

User Programmable Preset Capability, User program etc.

Languages: English, French, German, Spanish, Italian, Danish, Dutch, Finnish, Norwegian, Swedish

EUM Languages: English, German, Spanish, Italian, French

Up to 400 Programmable Annotations organized in 10 anatomical groups

Free programmable Scan assistant lists including Add, Delete, Edit and Reorder of checklist items

Four programmable Px buttons for documentation preferences like Save, DICOM Send, Print, Check, Cine length etc.

Several user configurable functions:

- Clinic Name
- Display (TGC curve, Screen Lock, Screensaver, Auto Scan Stop, Beeper, 3D/4D Screen Controls)
- Trackball speed
- Dim function
- Zoom: Overview window
- Patient Info display
- Title bar settings
- Start Exam and End Exam Configuration

Measure Setup

M&A Setup including Add, Delete, Edit and Reorder of measure items

Application Setup including several parameters of Measurement, Doppler Trace and Calculation presets

Global Setup including several parameters of Measurement, Cursor and Result window presets

Biopsy Setup

User programmable needle guidelines

Pre-Processing

Write Zoom up to 8x

B/M-Mode:

- Gain
- TGC
- Dynamic Range
- Acoustic Output
- Transmission Focus Position
- Transmission Focus Number
- Transmission Frequency
- Edge Enhancement
- Persistence Control
- Line Density Control
- Reject
- Sweep Speed
- M-Cursor position

PW-Mode:

- Gain
- Dynamic Range
- Acoustic Output
- Transmission Frequency
- PRF
- Wall Motion Filter
- Sample Volume Gate
- Length, Depth, Pos
- Velocity Scale
- Sweep Speed

Color Flow Imaging Modes (CFM, PD, TD, HD-Flow)

- Gain
- Acoustic Output
- PRF
- Wall Motion Filter
- Line density
- Ensemble
- Dynamic
- Smooth (Rise and Fall)
- Frequency
- Balance
- Line Filter
- Quality
- Artifact Suppression

Post-Processing

Read Zoom: 0.8x - 3.4x Zoom (with HD-Zoom functionality up to 22x Zoom)

B-Mode:

- 2D Gain
- Dyn. Contr.
- Gray Map
- Colorized B
- Advanced SRI

M-Mode:

- Gray Map
- Colorized M
- Display Format
- Sweep Speed

PW Mode:

- Gray Map
- Baseline Shift
- Angle Correction
- Colorized D
- Scale (KHz, m/s, cm/s)
- Trace
- Invert
- Sweep Speed

Color Flow Imaging Modes (CFM, PD, TD, HD-Flow):

- Display Threshold
- Display Mode (V, V-TT, P, P-T) (CFM only)
- Color Map
- Scale (CFM and HD-Flow)
- Baseline

System overview *(cont.)*

Post-processing *(cont.)*

B-Flow

- Gray Map
- Colorized B-Flow
- Advanced SRI (Speckle Reduction Imaging)
- Dyn. Contr.

Image Processing and Presentation

Digital Beam former

67584 system processing channel technology

Displayed Imaging Depth: 0 – 30 cm

Minimum Depth of Field: 0 – 1 cm (Zoom, probe dependent)

Maximum Depth of Field: 0 – 36 cm (probe dependent)

Transmission Focus

1-5 Focus Points selectable (probe and application dependent)

Focal Zone position, up to 7 steps

Continuous Dynamic Receive Focus / Continuous Dynamic Receive Aperture

256 shades of gray

16,8 Mio Colors 24 bit

Up to 180 dB Dynamic. Range adjustable by selecting 12 Dynamic Control Curves

Image Reverse: Right/ Left

Rotation: 0°, 180°

Cine Features

Cine Features:

- Dual/Quad Image CINE Display
- CINE Gauge and CINE Image number display
- CINE Review Loop
- Selectable CINE Sequence for CINE Review (by Start Frame and End Frame)
- Side Change in dual CINE Mode
- Measurements/Calculations & Annotations on CINE

Length:

- 2D: 512MB: up to 10 min (depending on B-image size and FPS); typical: about 3min/4000 images (with curved array: 15cm depth, angle 81°, 22 FPS)
- M-Mode: 32MB: up to 20 min motion time (depending on sweep speed and depth)
- Dop.- Mode: 32MB: up to 10 min motion time (depending on sweep speed)

Cine operation:

- Manual: image by image
- Auto run: speed: 25 to 200% of real-time rate, play repeat mode: forward-forward, forward-backward-forward

Image/ Volume Storage (Archive)

Image data stored as:

- Raw Data file (proprietary format)
- DICOM file (Single- or Multiframe)

Volume file stored as

- Raw Data file (proprietary format)
- Size: typically: 0.8 - 5MB (depending on probe and adjusted volume size)

• Compression:

- 2D: JPEG, Lossless, high, mid low
- 3D/4D: Lossy and lossless compression available. Typical compression rates are 50% with lossless compression, 15% with lossy compression but maximum quality and 5% with lossy compression and reduced quality (approximate values).

Review of current Exam and archived data sets (Single Images and Cine Clips). View Format: Raw data, DICOM data. Display Formats: 1x1, 2x2, 3x3

Reload of current/ archived data sets: 2D Raw Data (incl. Color Doppler, Spectral Doppler and M-Mode). 3D Raw Data (Single Volume incl. Calc. Cines) . 4D Raw Data (Volume Cine).

Export as:

- Bitmap files: BMP, TIFF, JPEG;
- Raw files: RAW (2D), VOL (Volume data), 4DV (RAW, VOL incl. Patient data)
- Sequence of Bitmaps: BMP, AVI, MOV;
- DICOM Files: DCM, DICOM Files with DICOMDIR
- 3D Raw Data: conversion to Cartesian format possible

AVI Codec: MPEG4, MS Video 1, FullFrames

Export to: DVD+/- R(W), CD-R(W), Network, USB devices

Export Anonymous function: yes, available for following image types: AVI, MOV, BMP, TIFF, JPEG

Backup function to: DVD+/- R(W) / CD-R(W), Network, USB devices

Repro function: Settings recall (e.g. Geometry, Gain, Colormap, etc.) from a stored or reloaded picture

Exam History: direct access to images from previous exams; direct access to Measure Reports images from previous exams; Image compare window on screen to compare images from previous exams with current exam image

Hard Drive Data Storage size: about 450 GB

Connectivity

Ethernet network connection

USB for USB devices

DICOM support:

- Verify
- Print
- Store
- Modality Worklist
- Structured Reporting
- Storage Commitment
- MPPS (Modality performed procedure step)
- Media Exchange
- Off network / mobile storage queue

Query/Retrieve

Scanning Parameters

B-Mode

| | |
|--|--|
| B Acoustic Power | 0-100 |
| Frequency range: | 1-18Mhz (Depending on the probe, 3 steps high, mid, low) |
| Frame rate | > 700 fps (depending on probe and application) |
| Scan Angle | max 360° (probe dependent) |
| GAIN range: | + 15 to - 15dB |
| Gray scale values | 32 bit |
| SRI | 6 steps (0-5) |
| CRI | 8 steps (1-8) |
| CRI filter | 4 steps: off, low, mid, high |
| CE | On/Off (Probe dependent) |
| FFC | On/Off (Probe dependent) |
| Persistence filter | 8 steps (pre) |
| Line filter | 3 steps (pre) off, low (12,5/75/12,5%), high (25/50/25%) |
| Line Density | 3 steps (pre) low, norm, high |
| Reject | 51 steps (pre) from 0 to 225\ |
| Enhance | 6 steps (pre) 0, 1, 2, 3, 4, 5 |
| Gray maps | 21 (18 basic maps and 3 User-defined maps) |
| Tint maps | 15 |
| Dynamic | 12 different dynamic curves C1 - C12 |
| Display Modes | B, XTD |
| Screen Formats: | |
| • 2D Imaging: Single (B), Dual (B+B), Quad (B+B+B+B) | |
| • XTD View: Single (XTD), Dual (B+XTD) | |

M-Mode

| | |
|--|--|
| Working Modes | M (conventional M-Mode), AMM (Anatomical M-Mode) |
| Frequency range | 1-18Mhz (Depending on the probe, 3 steps high, mid, low) |
| M Acoustic Power | 1-100 |
| M Gain | +/-15dB range, 1dB steps |
| M sweep speeds: | |
| • 900 / 450 / 300 / 225 / 150 / 100 pixels/sec; | |
| • 26,44 / 13,22 / 8,81 / 6,61 / 4,40 / 2,94 cm/s in relation to system monitor | |
| Review (memory times) | >60 s (32MB) |
| Signal processing M: | |
| • Dynamic range: 1 to 12 | • Gray maps: 18 |
| • Reject: 0 to 255 | • Tint maps: 15 |
| • Enhance: 0 to 5 | |
| Display Modes: | |
| • M: 2D+M, 2D+M/CFM, 2D+M/HD-Flow, 2D+M/PD, 2D+M/TD | |
| • AMM: 2D+AMM, 2D/CFM+AMM/CFM, 2D/HD-Flow+AMM/HD-Flow, 2D/TD+AMM/TD | |

- Screen Formats: (window arrangement)
 - 2D+M and 2D+AMM: up/down (horizontal): three different sub formats 30/70, 50/50, 70/30% left/right (vertical): 50/50%
 - 2D+AMM+AMM: left//rt-up/rt-down: 50//25/25%

M-Color Flow Mode

| | |
|---|--|
| Acoustic MCFM Power | 1-100 |
| Frequency range: | 1-18Mhz (Depending on the probe, 3 steps high, mid, low) |
| MCFM Color Maps | 8 maps |
| CFM Gain | +/-16dB range, 1 dB steps |
| CFM Velocity Scale Range | PRF: 150Hz to 13kHz |
| Wall Motion Filter | 8 - 3000 Hz |
| Ensemble (color shots per line) | 8-16, step size 1 |
| Gentle color filter | |
| Smooth filter: | <ul style="list-style-type: none"> • Rise: 12 steps • Fall: 12 steps |
| CFM Spectrum Inversion | |
| CFM Baseline Shift | 17 steps |
| Pre-settable and independently adjustable B-, M and MCFM Gain | |
| CFM Threshold | 1 - 255 steps |
| Balance | 25 - 225, step size 5 |
| Artifact suppression | on/off |
| Color Display Mode: | |
| • V (Velocity) | • T (Turbulence) |
| • V-T (Velocity + Turbulence) | • P-T (Power + Turbulence) |
| • V-P (Velocity + Power) | |
| Real-time Triplex Mode | B + M +MCFM in any depth |

Spectral Doppler Mode (PW,CW)

| | |
|----------------------------------|---|
| Operating Modes | PW (Pulsed Wave Doppler, Single Gate), CW (Continuous Wave Doppler) |
| Frequency range | 1-18Mhz (Depending on the probe, 3 steps high, mid, low) |
| Pulse Repetition Frequency (PRF) | PW-Doppler: 1.3...22.0 kHz, CW-Doppler: 1.3 ...40.0 kHz |
| Sample Volume (Doppler Gate) | Length: 0.7, 1, 2, 3, 4, 5, 6, 7, 8, 9, 10, 15 mm Position: 5 mm to B-scan end Angle correction: - 85° ... 0° ... + 85° |
| Power control range | 1 - 100 |
| GAIN range | + 15 to - 25dB (PW), + 15 to - 15dB (CW) |
| WMF (wall motion filter) | PW: 60...500 Hz, CW: 30...1000 Hz |
| Zero line shift | ± PRF/2, ± 8 steps |
| Spectrum Analyzer | FFT (Fast Fourier Transformation), max. 256 channels, 255 amplitude levels |

Scanning Parameters *(cont.)*

Spectral Doppler Mode (PW,CW) *(cont.)*

| | |
|---|---|
| PW sweep speeds | Simplex (26,44/13.22/8.81/ 6.61/4.40 /2.94 cm/s), Duplex/ Triplex (8.81/6.61/4.40/2.94 cm/s) |
| Review (memory times) | >60 s (32MB) |
| Measurable flow velocities: | |
| <ul style="list-style-type: none"> PW: 1cm/s - 8m/s ($\alpha = 0^\circ$, 2.0MHz, max. zero shift) 1cm/s - 16m/s ($\alpha = 60^\circ$, 2.0MHz, max. zero shift) CW: 1cm/s - 11.60m/s ($\alpha = 0^\circ$, 2.0MHz, max. zero shift) 1cm/s - 23.20m/s ($\alpha = 60^\circ$, 2.0MHz, max. zero shift) Signal processing: Dynamic range: 15 steps (10 to 40) . Gray maps: 18 basic curves and 3 User-defined (pre, post), Tint maps: 15 | |
| Scale display | Vert.: kHz, cm/s, m/s (selectable), Hor.: 1s marker (big), $\frac{1}{2}$ s marker (small) |
| Screen Formats | 2D/D: up/down (horizontal): three different sub formats 30/70, 50/50, 70/30% left/right (vertical): 50/50%. D: pencil probes only |
| Display Formats | D/D (duplex update, simultaneous); 2D+CFM/D, 2D+HD-Flow/D, 2D+PD/D, 2D+TD/D (triplex update, CW or PW), 2D+CFM/PW, 2D+PD/PW, 2D+HDFlow/PW, 2D+TD/PW, (triplex simultaneous, PW only) |
| Audio-Modes | Stereo (both directions separately in both channels) |
| Audio Volume | Adjustable, control digipots |

Color Doppler Mode

| | |
|--|--|
| Screen Formats | 2D+CFM (Single, Dual, Quad) |
| Display Modes: | |
| <ul style="list-style-type: none"> Simultaneous dual mode: 2D/2D+CFM; Triplex mode: 2D+CFM/PW, 2D/M+MCFM; Volume Mode: 3D+CFM | |
| Color coding: | |
| <ul style="list-style-type: none"> Steps: 65536 color steps Display modes: V-T (velocity + turbulence), V (velocity), V-P (velocity + power), T (turbulence), P-T (power + turbulence) | |
| Depth range | Axial: 0 to B scan range lateral: 0 to B scan range |
| Baseline shift | 17 steps (independent from spectral Doppler) |
| Inversion of color direction | Yes |
| Wall Motion Filter: | 7 steps (low1, low2, mid1, mid2, high1, high2, max) |
| Smoothing Filter | 12 steps rising time 12 steps falling time |
| Gain control | +15dB to -15dB, 0.2dB step |
| Line Density (color line density) | 10 steps |
| Ensemble (color shots per line) | CFM: 7 to 31 MCFM: 8 to 16 |

| | |
|--|--|
| Flow Resolution | 4 steps (low, mid1, mid2, high) |
| Pulse repetition frequency | CFM: 150 Hz to 20.5 kHz, MCFM: 150 Hz to 20.5 kHz |
| Color Map | 8 different color codes for each probe |
| Frequency range | 1 to 18 MHz depending on the probe, adjustable in 3 steps (low, mid, high) |
| Balance | From 25 to 225 |
| Max. meas. velocity | 4.23 m/sec |
| Min. meas. velocity | 0.3 cm/sec |
| Scale | kHz, cm/s, m/s |
| Automatic moving tissue suppression | Yes |

Power Doppler Mode (PD)

| | |
|---|--|
| Screen Formats | 2D+PD (Single, Dual, Quad) |
| Display Modes: | |
| <ul style="list-style-type: none"> Simultaneous dual mode: 2D/2D+PD; Triplex mode: 2D+PD/PW; Volume Mode: 3D+PD; | |
| PD coding | 256 color steps |
| PD window size | Lateral: maximum to minimum B mode scan angle Axial: B-scan range |
| Display mode | P (power) |
| Wall motion Filter | 7 steps (low1, low2, mid1, mid2, high1, high2, max) |
| Smoothing Filter | Rising edge: 12 steps Falling edge: 12 steps |
| Gain control | +15dB to -15dB, 0.2dB steps |
| PD Ensemble | 7 to 31 |
| PD Line Density | 10 steps |
| Pulse repetition frequency | 150 Hz to 20,5kHz |
| PD Map | 8 different color codes for each probe |
| Frequency range | 1 to 16 MHz depending on the probe, adjustable in 3 steps (low, mid, high) |
| Flow Resolution | 4 steps (low, mid1, mid2, high) |
| Balance | From 25 to 225 in 41 steps |
| Frequency range | 1-18Mhz (Depending on the probe, 3 steps high, mid, low) |
| Artifact suppression | Yes |

Scanning Parameters *(cont.)*

HD-Flow

| | |
|------------------------------|---|
| Screen Formats | 2D+HDF (Single, Dual, Quad) |
| Display Modes: | |
| • Simultaneous dual mode: | 2D/2D+HDF |
| • Triplex mode: | 2D+HDF/PW; 2D/M+MHDF |
| • Volume Mode: | 3D+HDF |
| HD-Flow Coding Steps | 256 color steps |
| HD-Flow window size: lateral | Maximal to minimal B mode scan angle; axial: B-scan range |
| Display mode | P (power) |
| Wall Motion Filter | 7 steps (low1, low2, mid1, mid2, high1, high2, max) |
| Smoothing Filter | 12 steps rising edge; 12 steps falling edge |
| Gain Control | +15dB to -15dB, 0.2dB steps |
| HD-Flow Ensemble | 7 to 31 |
| HD-Flow Line Density | 10 steps |
| Pulse Repetition Frequency | 150Hz to 20.5KHz |
| HD-Flow Map | 8 different color codes for each probe |
| Frequency Range | 1 to 18 MHz depending on the probe adjustable in three steps (low, mid, high) |
| Flow Resolution | 4 steps (low, mid1, mid2, high) |
| Balance | From 25 to 225 |
| Artifact suppression | Yes |

Tissue Doppler Mode (TD)

| | |
|-----------------------------------|--|
| Screen Formats | 2D+TD (Single, Dual, Quad) |
| Display Modes | Simultaneous dual mode: 2D/2D+TD; Triplex mode: 2D+TD/PW, 2D/M+MTD; |
| TD coding steps | 65536 color steps |
| Depth range: | Axial: 0 to B-scan range Lateral: 0 to B-scan-range |
| Zero line shift | 17 steps |
| Inversion of color direction | Yes |
| Smoothing Filter | 12 steps rising time, 12 steps falling time |
| Gain control | +15dB to -15dB, 0.2dB steps |
| Line Density (color line density) | 10 steps |
| Ensemble (color shots per line) | 7 to 31 |
| Flow Resolution | 4 steps (low, mid1, mid2, high) |
| Pulse repetition frequency | 150 Hz to 20,5 kHz |
| TD Map | 4 different color codes for each probe |
| Frequency range | 1 to 18 MHz depending on the probe, adjustable in 3 steps (low, mid, high) |
| Balance | From 25 to 225 |
| Max. meas. velocity | 4.23 m/sec |

| | |
|---------------------|----------------|
| Min. meas. velocity | 0.3 cm/sec |
| Display Mode | V (velocity) |
| Scale | kHz, cm/s, m/s |

Volume Scan Module

Vol. scan size: max. 64 MB for gray volumes; max. 90 MB for color volumes; The required memory space depends on scan parameters (VOL-box size and quality (low, mid1, mid2, high1, high2, max). Typical: 0.8-5 MB

Lines/2D-image: max. 1024 (typ. 80 to 350)

2D-images/volume: Up to 4096 (Acquisition Mode dependent)

VOL-Frames/sec.: max. 40 (typ. 4-8); The frame rate depends on scan parameters: VOL-Box size, quality and probe

4D Volume Cine: up to 128 volumes

Display of sectional plane images: synchronous with control setting, arbitrary movement in volume, monitored position in volume

Rotation: 360°, 1° or 3° increments (X-, Y- and Z-axis)

Magnification: adjustable from 0.3 to a factor of 4.00

Acquisition Modes:

- 3D Static:
 - 3D (2D incl. CRI)
 - 3D/PD (incl. CRI)
 - 3D/CFM (incl. CRI)
 - 3D/HD-Flow incl. CRI
 - 3D B-Flow
 - 3D Contrast
 - Fetal Cardio
 - STIC Angio: B/Power Doppler (incl. CRI),
 - STIC CFM: B/Color Doppler (incl. CRI)
 - STIC HD-Flow: B/HD-Flow (incl. CRI)
 - STIC B-Flow
- 4D Real Time
- 4D Biopsy
- VCI-A
- VCI- OmniView
- STIC

Visualization Modes:

- 3D Rendering (diverse surface and intensity projection modes)
- SonoRenderStart
- Sectional Planes
- Multiplanar
- OmniView, actual –and projected view
- Niche
- SonoVCADlabor
- TUI (Tomographic Ultrasound Imaging (overview image + parallel slices)
- SonoVCADheart

Volume Analysis

- VOCAL : semi-auto/ manual segmentation tool (segmentation using touch screen), (3D Static only) Threshold Volume: measure volume below and above a threshold
- SonoAVC*follicle* (Sono Automated Volume Count)
- SonoAVC*general*
- VCI (Volume Contrast Imaging)
- V-SRI

Scanning Parameters (cont.)

Volume Scan Module (cont.)

| | | |
|---|--|--|
| Render Modes: | <ul style="list-style-type: none"> • HDlive • Surface Texture • Surface Smooth • Surface Enhanced • Surface Skin and Smooth | <ul style="list-style-type: none"> • Transparency modes: max- min- and x-ray • Gradient Light • Light |
| Inversion | | |
| Glass Body | | |
| Mix Mode of two Render Modes | | |
| Display graphics: | <ul style="list-style-type: none"> • Rotation axis, center point; • ROI box, 3D Frame; • Temporary display of onscreen controls (rotation, translation) | |
| Gray maps: Slices: 21 (18 basic curves and 3 User-defined (pre, post) 3D Image: one general map adjustable with bright (1-100) & contrast (1-100) | | |
| Frequency range: 1-18Mhz (Depending on the probe, 3 steps high, mid, low) | | |
| Tint maps: Slices: 15; 3D Image: 15 | | |
| Depth render maps: 3 | | |

BF (B-Flow)

| | |
|--------------------------------------|---|
| Screen Formats Quad (BF+BF+BF+BF) | Single (BF), Dual (BF+BF), |
| Display Modes | BF, Update: BF/PW |
| Acc. Power range | 1 - 100 |
| Scan angle | Taken from 2D |
| GAIN range | + 15 to - 15dB |
| Gray scale values | 32 bit |
| SRI taken from 2D | |
| Persistence filter | 8 steps (pre) |
| S./PRI | 1.00, 1.50, 2.00, 3.00, 4.00, 5.00 |
| Quality | 3 steps (pre) low, norm, high |
| Enhance | 6 steps (pre) 0, 1, 2, 3, 4, 5 |
| Gray maps User-defined maps) | 21 (18 basic maps and 3 |
| Tint maps | 15 |
| Dynamic curves C1 - C12 | 12 different dynamic |
| Accumulation 1.50, Infinite | Off, 0.20, 0.35, 0.50, 0.75, 1.00, |
| Background | 0, 1, 2 |
| Frequency range | 1-18 Mhz (Depending on the probe, 3 steps high, mid, low) |
| Acc. Power range | 1 - 100 |
| Frequency range | 1-18Mhz (Depending on the probe, 3 steps high, mid, low) |
| Scan angle | Taken from 2D |
| GAIN range | + 15 to - 15dB |

| | |
|--------------------|---|
| Gray scale values | 32 bit |
| SRI | 6 steps (1-6) |
| Persistence filter | 8 steps (pre) |
| S./PRI | 1.00, 1.50, 2.00, 3.00, 4.00, 5.00 |
| Quality: | 3 steps (pre) low, norm, high |
| Enhance | 6 steps (pre) 0, 1, 2, 3, 4, 5 |
| Gray maps | 21 (18 basic maps and 3 User-defined maps) |
| Tint maps | 5 |
| Dynamic | 12 different dynamic curves C1 - C12 |
| Accumulation | Off, 0.20, 0.35, 0.50, 0.75, 1.00, 1.50, Infinite |
| Background | 0, 1, 2 |
| Time Delay | 0, 0.5, 1, 2, 3,10 |
| 3D HyCoSy | |
| Display Modes: | <ul style="list-style-type: none"> • Code Harmonic Angio • Coded PI: CIS • Coded PI • Coded PI: CCIS |
| Screen Formats: | <ul style="list-style-type: none"> • Coded Harm. Angio: Single (B), Dual (B+B), Quad (B+B+B+B) • Code PI: Single (B), Dual (B+B), Quad (B+B+B+B) • CIS: Dual simultan (2D + Coded PI) • CCIS: Sngle (B), Dual (B+B), Quad (B+B+B+B) |

Elastography (Not available in all countries)

| | |
|--|--|
| Acoustic Power range: 1 - 100 | |
| Tx Frequency: 3 (penet/norm/resol) | |
| Transparency: 51 steps 90,5,10,....,255) | |
| Soft compress: | <ul style="list-style-type: none"> • Range: 0-9 • Step Size: 1 |
| Hard Compress: | <ul style="list-style-type: none"> • Range 0-9 • Step Size: 1 |
| PRF: 10, 15, 25, 40, 60, 85 Hz | |
| Elasto Maps: 8 | |
| Persistence: | <ul style="list-style-type: none"> • Range: 1-9 • Step Size: 1 |
| Line Dens.: | <ul style="list-style-type: none"> • Range: 1-2 |
| Filter Axial: | <ul style="list-style-type: none"> • Range: 1-9 • Step Size: 1 |
| Filter lateral: | <ul style="list-style-type: none"> • Range: 1-21 • Step Size: 2 |
| Window length: | <ul style="list-style-type: none"> • Range: 8-25 • Step Size: 1 |
| Screen Formats: | <ul style="list-style-type: none"> • Single (2D/Elasto) • Dual (2D/Elasto+2D/Elasto) • Quad (2D/Elasto+2D/Elasto+2D/Elasto+2D/Elasto) |

Scanning features

Coded Excitation (CE)

Available on the following probes:

- AB2-7-D
- C4-8-D
- 11L-D
- M6C
- RAB4-8-D
- RIC5-9-D
- RAB6-D

Coded Harmonic Imaging

Available on all probes, except:

- P2D
- P6D

Focus Frequency Composite (FFC)

Available on the following probes:

- 4C-D
- M6C
- AB2-7
- IC5-9-D
- C1-5-D
- RAB2-5-D
- RAB4-8-D
- RIC5-9-D
- RRE5-10-D
- RRE6-10-D
- RNA5-9-D
- RAB6-D

Compound Resolution Imaging (CRI)

Available on all probes, except:

- 3SD
- PA6-8-D
- P2D
- P6D

Speckle Reduction Imaging (SRI)

Available on all probes, except:

- P2D
- P6D

Virtual Convex

Available on all linear probes

Wide Sector

Available on:

- IC5-9-D
- RIC5-9-D
- RIC6-12-D
- RRE5-10-D
- RRE6-10-D
- C 1-5-D
- C 4-8-D
- M6C
- 4C-D
- AB 2-7-D
- RAB 4-8-D
- RAB 2-5 -D
- RM6C-D
- RNA 5-9-D
- RAB6-D

Measurements Tool

Generic Measurements

Distance

- Distance (Point to Point)
- Distance (Line to Line)
- 2D Trace (Trace Length)
- 2D Trace (Point Length)
- Stenosis (% Dist)

Area/Circumference

- Ellipse
- Trace (Line)
- Trace (Point)
- Stenosis (% Area)
- Area (2 Dist.)

Volume: following Methods:

- 1 Distance
- 1 Ellipse
- 1 Dist. + Ellipse
- 3 Distance
- Multiplane - Planimetric Volume (3D only)

Angle:

- Angle (3 Point)
- Angle (2 Line)

M-Mode

- Distance (Point to Point)
- Time
- Slope
- HR
- Stenosis (% Dist)

Doppler Mode

- Auto & Manual Trace:
 - PS (Peak Systole)
 - ED (End Diastole)
 - MD (Min. Diastole)
 - PS/ED (Ratio)
 - PI (Pulsatility Index)
 - RI (Resistance Index)
- TAmx (Time avg. max. Velocity)
- TAmn (Time avg. mean Velocity)
- VTI (Velocity Time Integral)
- Ductus venosus: S, D, a, PI, PLI, PVIV
- Heart Rate

Single Measurements:

- Velocity
- Acceleration
- RI
- PI
- PS/ED
- Time
- HR

Abdomen Calculations

Liver

Gallbladder

Pancreas

Spleen

Kidney (right/left)

Renal Artery (right/left)

Aorta (Proximal, Mid, Distal)

Portal Vein

Vessel

Bladder Volume

Summary Reports

Small Part Default Calculations

Thyroid (right/left)

Testicle (right/left)

Vessel

Summary Reports

Small Part Breast Calculations

Lesion 1-5 (right/left)

Summary Reports

Measurements Tool *(cont.)*

Obstetrics Calculations

| |
|---|
| Fetal Biometry |
| Early Gestation |
| Fetal Long Bones |
| NBL (Nasal Bone Length) |
| Fetal Cranium |
| NT Method: SonoNT/Manual |
| IT |
| AFI |
| Uterus |
| Ovary |
| Fetal Doppler measurements (Ductus Art., Ductus Ven., Ao, Carotid, MCA, Celiac Artery, Superior Mesenteric Artery, Umbilical Art., Umbilical Vein, Uterine Art., Umbilical Vein, FHR, Atrial FHR) |
| Gestational Age Calculation |
| Gestational Growth Calculation |
| Fractional limb Volume |
| Fetal Weight (FW) Estimation |
| Fetal Trend Graph |
| Multi-Gestational Calculation & Fetal Compare |
| Calculation and Ratios |
| Fetal Qualitative Description (Anatomical survey) |
| Fetal Environmental Description (Biophysical profile) |
| Summary Reports |

Obstetrics Fetal Echo

| |
|-----------------------------|
| 4-Chamber-view |
| Thorax |
| Outflow Tract, Aortic arch |
| Venous |
| Tricuspid valve |
| Mitral Valve |
| Aortic Valve |
| Main Pulmonary Artery |
| Pulmonary Valve |
| Aorta, Ductus Art. |
| Umbilical Vein, Ductus Ven. |
| FHR |
| Atrial FHR |
| LVOT |
| RVOT |
| Pulmonary Veins |
| Carotid |
| TEI Index |
| Rt/Lt-UmA. |
| IVC |
| Summary Reports |

Obstetrics Z-Scores

Calculation of Z-Scores for:

- Long Axis
- Aortic Arch
- Short Axis
- Obl. Short axis
- 4 Chambers
- Summary Reports

Cardiology

2D Mode:

- LV Simpson (Single & Bi-Plane)
- Volume (Area Length)
- LV-Mass (Epi & Endo Area, LV Length)
- LV (RVD, IVS, LVD, LVPW)
- LVOT Diameter
- RVOT Diameter
- MV (Dist A, Dist B, Area)
- TV (Diameter)
- AV/LA (Aortic Valve/Left Atrium)
- PV (Diameter)

M-Mode:

- LV (IVS, LVD, LVPW, RVD)
- AV/LA (Ao Root Diam, LA Diam, AV Cusp Sep., Ao Root Ampl)
- MV (D-E, E-F Slope, A-C Interval, EPSS)
- HR (Heart Rate), Atrial HR

PW Doppler Mode:

- MV (Mitral Valve)
- AV (Aortic Valve), TV (Tricuspid Valve)
- PV (Pulmonary Valve)
- LVOT & RVOT Doppler (Left & Right Ventricle Outflow Tract)
- Pulmonic Veins
- PAP (Pulmonary Artery Pressure measurement)
- HR (Heart Rate)

C-Mode:

- PISA
- Tei-Index

Others:

- Diastolic Vol (Bi)
- Systolic Vol (Bi)
- Stroke Volume
- Volume Flow
- Cardiac Output
- Ejection Fraction
- Fractional Shortening
- Myocardial Thickness
- LA/Ao Ratio
- E/A Peak
- Peak Gradient Acceleration
- Mean Gradient
- Mean Gradient Acceleration
- VTI
- TVA
- PG
- PHT
- MVA
- AVA
- ERO
- CVP
- (Cardio Vascular Profile) Score

• Summary Reports

Urology

Bladder

Prostate

Left/Right Testicle

Left/Right Kidney

Left/Right Renal Artery

Left/Right Dorsal Penile Artery

Vessel

Summary Reports incl. PSAD, PPSA(1), PPSA(2) calculation

Measurements Tool *(cont.)*

Vascular

| |
|--|
| Left/Right CCA (Common Carotid Artery) |
| Left/Right ICA (Internal Carotid Artery) |
| Left/Right ECA (External Carotid Artery) |
| Left/Right Vertebral Artery |
| Left/Right Subclav. |
| Left/Right Bulb |
| Vessels |
| Summary Reports |

Gynecology

| |
|--|
| Uterus |
| Right/Left Ovary |
| Right/Left Follicle |
| Fibroid |
| Endometrial thickness (Dist, Double Dist.) |
| Cervix Length |
| Left/Right Ovarian Artery |
| Left/Right Uterine Artery |
| Vessels |
| Pelvic Floor |
| FHR |
| Summary Reports |

Pediatrics

| |
|----------------------|
| Left/Right Hip Joint |
| Pericallosal Artery |
| Summary Report |

Neurology

| |
|--|
| Left/Right ACA (Anterior Cerebral Artery) |
| Left/Right MCA (Middle Cerebral Artery) |
| Left/Right PCA (Posterior Cerebral Artery) |
| Basilar Artery |
| A-Com. A (Anterior Com. Artery) |
| P-Com. A (Posterior Com. Artery) |
| Left/Right CCA (Common Carotid Artery) |
| Left/Right ICA (Internal Carotid Artery) |
| Left/Right Vertebral Artery |
| Vessels |
| Summary Reports |

OB Tables

Age Tables:

- AC: ASUM, CFEF, Hadlock_82, Hadlock_84, Hansmann, Hobbins, Jeanty, JSUM, Kurmanavicius, Merz, Nicolaides, Shinozuka, Siriraj, Tokyo
- AD: Persson
- APAD: Merz

- APTD: Hansmann
- APTDxTTD: Shinozuka, Tokyo
- BOD: Jeanty
- BPD: ASUM, ASUM (old), Campbell, CFEF, Chitty (outer-outer) (outer-inner), Chitty, Hadlock_82, Hadlock_84, Hansmann, Hobbins, Jeanty, Johnsen, JSUM, Kurmanavicius, Kurtz, Persson, Merz, Nicolaides, OSAKA, Rempen, Sabbagha, Shinozuka, Siriraj, Tokyo, Verburg (outer-outer)
- CLAV: YARKONI
- CRL: ASUM, ASUM(old), DAYA, Hadlock, Hansmann, JSUM, Persson, Nelson, OSAKA, Rempen, Robinson, Shinozuka, Tokyo, Verburg
- EFW: Hadlock, JSUM 2001, Osaka, Shinozuka, Tokyo
- FL: ASUM, ASUM_OLD, CFEF, Chitty, Hadlock_82, Hadlock_84, Hansmann, Hobbins, Hohler, Jeanty, JSUM, Kurmanavicius, Persson, Merz, Nicolaides, O'Brien, OSAKA, Shinozuka, Siriraj, Tokyo, WARDA, Johnsen
- FTA: OSAKA
- FIB: Jeanty
- GS: Hansmann, Hellman, Holländer, Rempen, Tokyo
- HC: ASUM, CFEF, Chitty, Hadlock_82, Hadlock_84, Hansmann, Jeanty, Johnsen, Kurmanavicius, Merz, Nicolaides, Siriraj, Johnsen
- HL: ASUM, Hobbins, Jeanty, Merz, OSAKA
- LV: Tokyo
- MAD: EIK-NES, Kurmanavicius
- OFD: ASUM, Chitty, Hansmann, Jeanty, Kurmanavicius, Merz, Nicolaides
- RAD: Jeanty, Merz
- TIB: Jeanty, Merz
- TAD: CFEF, Merz, Chitty, Goldstein, HILL, Hobbins, Nicolaides, Hansmann
- ULNA: Jeanty, Merz

Growth Tables:

- AC: ASUM, CFEF, Chitty, Hadlock, Hansmann, Jacot-Uillarmod, Jeanty, JSUM, Kurmanavicius, Lessoway, Merz, Nicolaides, Shinozuka, Siriraj, Tokyo, Verburg, Johnsen
- AD: Persson
- AFI: Moore
- Aorta Vmax: Rizzo
- APTDxTTD: Shinozuka, Tokyo
- BOD: Jeanty
- BPD: ASUM, Campbell, CFEF, Chitty, Hadlock, Hansmann, Jacot-Uillarmod, Jeanty, JSUM, Kurmanavicius, Lessoway, Persson, Merz, Nicolaides, OSAKA, Sabbagha, Shinozuka, Siriraj, Tokyo, Verburg
- CLAV: YARKONI
- CM: Nicolaides
- CRL: ASUM, Hadlock, Hansmann, JSUM, Persson, OSAKA, Robinson, Shinozuka, Tokyo
- DV PI, DV PLI, DV PVIV, DV S/a: Baschat
- EFW: Brenner, Doubilet, Hadlock, Hansmann, Hansmann(86), Hobbins/Persutte, JSUM 2001, Persson, Osaka, , Shinozuka, Tokyo, Williams, Yarkoni (Twins) , Ananth (Twins, Monochorionic), Ananth (Twins Dichorionic), Johnsen
- FL: ASUM, CFEF, Chitty, Chitty, Hadlock, Hansmann, Jacot-Uillarmod, Jeanty, JSUM, Kurmanavicius, Lessoway, Persson, Merz, Nicolaides, O'Brien, OSAKA, Shinozuka, Siriraj, Tokyo, Verburg, WARDA, Johnsen

Measurements Tool *(cont.)*

OB tables *(cont.)*

- FTA: OSAKA
- FIB: Chitty, Jeanty, Siriraj
- Foot: Chitty
- GS: Hellman, Rempen, Tokyo
- HC: ASUM, CFEF, Chitty, Hadlock, Hansmann, Jacot-Uillarmod, Jeanty, Kurmanavicius, Lessoway, Merz, Nicolaides, Siriraj, Verburg, Johnsen
- HL: ASUM, Chitty, Jeanty, Merz, OSAKA, Siriraj
- LV: Tokyo
- MCA PI, RI: JSUM, Bahlman
- MCA PV: Mari
- MAD: EIK-NES, Kurmanavicius
- MV E/A: HARADA
- NBL: BUNDUKI, SONEK
- OFD: ASUM, Chitty, Hansmann, Jeanty, Kurmanavicius, Merz, Nicolaides
- MainPA Vmax: Rizzo
- RAD: Chitty, Jeanty, Merz, Siriraj
- TAD: CFEF, JACOT-GUILLARMOD, Merz,
- TC: Chitkara
- TCD: Goldstein, HILL, JACOT-GUILLARMOD, Nicolaides, Verburg
- TIB: Chitty, Jeanty, Merz, Siriraj
- TTD: Hansmann
- TV E/A: HARADA
- ULNA: Chitty, Jeanty, Merz, Siriraj
- UmbArt PI: JSUM, Merz
- UmbArt RI: JSUM, Merz, Kurmanavicius
- Fractional Limb Avol/Tvol: Lee

Fetal weight Estimation (EFW)

- Campbell (AC)
- Hadlock (AC, BPD)
- Hadlock 1 (AC, FL)
- EFW
- Hadlock 2 (BPD, AC, FL)
- Hadlock 3 (HC, AC, FL)
- Hadlock 4 (BPD, HC, AC, FL)
- Hansmann (BPD, TTD)
- Merz (AC, BPD)
- Osaka (BPD, FTA, FL)
- Persson (BPD, MAD, FL)
- Persson 2
- Schild (HC, AC, FL)
- Shepard (AC, BPD)
- Shinozuka 1 (BPD, APTD, TTD, FL)
- Shinozuka 2 (BPD, FL, AC)
- Shinozuka 3 (BPD, APTD, TTD, LV)
- Tokyo (BPD, APTD, TTD, FL)

Fetal ratios

CI (BPD/OFD) (Hadlock)

FL/AC (Hadlock)

FL/BPD (Hohler)

FL/HC (Hadlock)

HC/AC (Campbell)

Va/Hem (Nicolaides)

Va/Hem (Hansmann)

Vp/Hem (Nicolaides)

Probes

4C-D

| | |
|----------------------------|---|
| Wide Band Convex Probe | |
| Applications | Abdomen, OB, GYN, Peripheral Vascular |
| Maximum Band Width (-20dB) | 2.0 – 5.0 MHz |
| Number of Elements | 128 |
| Convex Radius | 60.5 mm |
| FOV | 58° |
| Foot Print | 18.3 x 68.7 mm |
| Depth | Max. 30 cm |
| Biopsy Guide available | 4C, Multi-Angle, disposable with reusable bracket |

C1-5-D

| | |
|----------------------------|---|
| Wide Band Convex Probe | |
| Applications | Abdomen, OB, GYN, Peripheral Vascular |
| Maximum Band Width (-20dB) | 2.0 – 5.0 MHz |
| Number of Elements | 192 |
| Convex Radius | 56.1 mm |
| FOV | 69° |
| Foot Print | 69.3 x 17.2mm |
| Depth | Max. 30 cm |
| Biopsy Guide available | Multi-Angle, disposable with reusable bracket |

C4-8-D

| | |
|----------------------------|---|
| Wide Band Convex Probe | |
| Applications | Abdomen, OB, GYN, Pediatrics |
| Maximum Band Width (-20dB) | 2.0 - 8.0 MHz |
| Number of Elements | 192 |
| Convex Radius | 39.1 mm |
| FOV | 70° |
| Foot Print | 55.2 x 17.6mm |
| Depth | Max. 26 cm |
| Biopsy Guide available | Multi-Angle, disposable with reusable bracket |

Probes (cont.)

AB2-7-D

| | |
|----------------------------|--|
| Wide Band Convex Probe | |
| Applications | Abdomen, OB, GYN, Urology, Pediatrics, Musculoskeletal |
| Maximum Band Width (-20dB) | 2.0 – 8.0 MHz |
| Number of Elements | 192 |
| Convex Radius | 41.2 mm |
| FOV | 80° |
| Foot Print | 58.9 x 23.4 mm |
| Depth | Max. 28 cm |
| Biopsy Guide Available | Single-Angle, Reusable |

M6C

| | |
|----------------------------|---|
| Wide Band Convex Probe | (1.25D Array) |
| Applications | Abdomen, OB, GYN, Pediatrics |
| Maximum Band Width (-20dB) | 2.0 – 6.0 MHz |
| Number of Elements | 960 |
| Convex Radius | 50.7 mm |
| FOV | 60° |
| Foot Print | 62.8 x 24.8 mm |
| Depth | Max. 26 cm |
| Biopsy Guide available | Multi-Angle, disposable with reusable bracket |

IC5-9-D

| | |
|----------------------------|------------------------|
| Wide Band Convex Probe | |
| Number of Elements | 192 |
| Applications | OB, GYN, Urology |
| Maximum Band Width (-20dB) | 4.0 – 9.0 MHz |
| Convex Radius | 10.0 mm |
| FOV | 146° |
| FOV (Wide Sector) | 179° |
| Foot Print | 21.2 x 17.2 mm |
| Depth | Max. 16cm |
| Biopsy Guide Available | Single-Angle, Reusable |

SP10-16-D

| | |
|----------------------------|---|
| Wide Band Linear Probe | |
| Applications | Small Parts, Peripherals, Vascular, Pediatrics, MSK |
| Maximum Band Width (-20dB) | 7.0 - 18.0 MHz |
| Number of Elements | 192 |
| FOV | 33.7 mm |
| Foot Print | 43.4 x 12.7 mm |
| Depth | Max. 6.0cm |
| Steered Angle | Max. 25° |
| Biopsy Guide available | PEC64 |

11L-D

| | |
|----------------------------|---|
| Wide Band Linear Probe | |
| Applications | Small Parts, Peripheral Vascular, Pediatrics, MSK |
| Maximum Band Width (-20dB) | 4.0- 10.0 MHz |
| Number of Elements | 192 |
| FOV | 38.4 |
| Foot Print | 46.9 x 14.4 mm |
| Depth | Max. 11cm |
| Biopsy Guide Available | Multi-Angle, disposable with reusable bracket |

9L-D

| | |
|----------------------------|---|
| Wide Band Linear Probe | |
| Number of Elements | 192 |
| Applications | Small-Parts, Peripherals, Pediatrics, MSK |
| Maximum Band Width (-20dB) | 3.0 – 8.0MHz |
| FOV | 43mm (width) |
| Foot Print | 5.31 x 13.8 mm |
| Depth | Max. 14cm |
| Biopsy Guide available | 9L, Multi-Angle, disposable with reusable bracket |

ML6-15-D

| | |
|-------------------------------|--|
| Wide Band Matrix Linear Probe | |
| Number of Elements | 1008 |
| Applications | Small-Part, Peripheral Vascular, Pediatric, Breast, Musculo-skeletal, Neonatal, Urology, Small-Parts |
| Maximum Band Width (-20dB) | 4.0 – 13.0MHz |
| FOV | 49.6 mm (width) |
| Foot Print | 60.7 x 16 mm |
| Depth | Max. 12cm |
| Biopsy Guide available | Multi-Angle, disposable with reusable bracket |

RAB2-5-D

| | |
|-------------------------------|--|
| Wide Band Convex Volume Probe | |
| Applications | Abdomen, OB, GYN, Musculoskeletal |
| Maximum Band Width (-20dB) | 1.0 – 4.0 MHz |
| Number of Elements | 192 |
| Convex Radius | 46 mm |
| Volume Sweep Radius | 22.6 mm |
| FOV | 80° (B), 80° x 85° (Volume scan) |
| FOV (Wide Sector) | 98° (B), 98° x 85° (Volume scan) |
| Foot Print | 63.6 x 38.9 |
| Depth | Max. 30cm |
| Biopsy Guide Available | PEC74, Single-Angle, Reusable and disposable |

Probes (cont.)

RAB4-8-D

| | |
|-------------------------------|---|
| Wide Band Convex Volume Probe | |
| Applications | Abdomen, OB, GYN, Pediatric, Urology, Musculoskeletal |
| Maximum Band Width (-20dB) | 2.0 – 8.0 MHz |
| Number of Elements | 192 |
| Convex Radius | 46 mm |
| Volume Sweep Radius | 22.6 mm |
| FOV | 70° (B), 70° x 85° (Volume scan) |
| FOV (Wide Sector) | 90° (B), 90° x 85° (Volume scan) |
| Foot Print | 63.6 x 37.8 mm |
| Depth | Max. 26cm |
| Biopsy Guide Available: | PEC74, Single-Angle, Reusable and disposable |

RAB6-D

| | |
|-------------------------------|--------------------------------------|
| Wide Band Convex Volume Probe | |
| Applications: | Abdomen, OB, GYN, Pediatric, Urology |
| Maximum Band Width (-20dB) | 2.0 – 8.0 MHz |
| Number of Elements | 192 |
| Convex Radius | 46 mm |
| Volume Sweep Radius | 22.6 mm |
| FOV | 70° (B), 70° x 85° (Volume scan) |
| FOV (Wide Sector) | 90° (B), 90° x 85° (Volume scan) |
| Foot Print | 63.6 x 37.8 mm |
| Depth | Max. 26cm |
| Biopsy Guide Available | Disposable |

RM6C

| | |
|---|--------------------------------------|
| Wide Band Convex Volume Probe with Active Matrix Array Technology | |
| Number of Elements | 960 |
| Applications | Abdomen, OB, GYN, Pediatric, Urology |
| Maximum Band Width (-20dB) | 1.0 – 7.0 MHz |
| Convex Radius | 58.8 mm |
| Volume Sweep Radius | 22.8mm |
| FOV | 60° (B), 60° x 85° (Volume scan) |
| FOV (wide phased) | 90° (B), 90° x 85° (Volume scan) |
| Foot Print | 64.1 x 40.1 mm |
| Depth | Max. 26cm |
| Biopsy Guide Available | PEC 81, Single-Angle, Reusable |

RIC5-9-D

| | |
|-------------------------------|--|
| Wide Band Convex Volume Probe | |
| Applications | OB, GYN, Urology |
| Band Width (-20dB) | 4.0–9.0MHz |
| Number of Elements | 192 |
| Convex Radius | 11.6 mm |
| Volume Sweep Radius | 11.6 mm |
| FOV | 146° (B), 146°*120° (Volume scan) |
| FOV (Wide Sector) | 179° (B), 179°*120° (Volume scan) |
| Foot Print | 22.4 x 22.6 mm |
| Depth | Max. 16cm |
| Biopsy Guide Available | PEC63, Single-Angle, Reusable, Disposable, disposable with latex cover |

RIC6-12-D

| | |
|-------------------------------|--|
| Wide Band Convex Volume Probe | |
| Applications | OB, GYN, Urology |
| Band Width(-20dB) | 5.0–13.0MHz |
| Number of Elements | 256 |
| Convex Radius | 11.6 mm |
| Volume Sweep Radius | 11.6 mm |
| FOV | 149° (B), 149°*120° (Volume scan) |
| FOV (wide phased) | 195° (B), 195° x 120° (Volume scan) |
| Foot Print | 22.4 (B) x 22.6 (V) mm |
| Depth | Max. 13cm |
| Biopsy Guide Available | PEC63, Single-Angle, Reusable, Disposable, disposable with latex cover |

RSP6-16-D

| | |
|-------------------------------|---|
| Wide Band Linear Volume Probe | |
| Applications | Small Parts, Peripherals, Vascular, Pediatrics, MSK |
| Maximum Band Width (-20dB) | 6.0 – 18.0 MHz |
| Number of Elements | 192 |
| Volume Sweep Radius | 80.7 mm |
| FOV | 37.4 mm (B); 37.4 mm * 29° (Volume scan) |
| Foot Print | 48.6 x 55.9 mm |
| Depth | Max. 8cm |
| Biopsy Guide Available | PEC75, Single-Angle, Reusable and Disposable |

Probes (cont.)

RSM 5-14

| | |
|---|---|
| Wide Band Linear Volume Probe with Active Matrix Array Technology | |
| Number of Elements | 960 |
| Applications | Small Parts, Peripherals, Vascular, Pediatrics, Ortho |
| Maximum Band Width (-20dB) | 5.0 – 13.0MHz |
| Volume Sweep Radius | 61.1mm |
| FOV | 37.5mm (B) x 30° (Volume scan) |
| Foot Print | 54.3mm x 50.5mm |
| Depth | Max. 8cm |
| Biopsy Guide Available | PEC 80, Single-Angle, Reusable |

RM14L

| | |
|---|---|
| Wide Band Linear Volume Probe with Active Matrix Array Technology | |
| Number of Elements | 960 |
| Applications | Small Parts, Peripherals, Vascular, Pediatrics, Ortho |
| Maximum Band Width (-20dB) | 4.0 – 14.0MHz |
| Volume Sweep Radius | 61.1mm |
| FOV | 37.4mm (B) x 30° (Volume scan) |
| Foot Print | 54.3mm x 50.5mm |
| Depth | Max. 10cm |
| Biopsy Guide Available | PEC 80, Single-Angle, Reusable |

RNA5-9-D

| | |
|-------------------------------|--|
| Wide Band Convex Volume Probe | |
| Number of Elements | 192 |
| Applications | Abdominal, Small Parts, OB, Cardiology, Pediatrics, Neonatal, Musculoskeletal, Peripheral Vascular |
| Maximum Band Width (-20dB) | 3.0–9.0 MHz |
| Convex Radius | 15.4mm |
| Volume Sweep Radius | 15.4 mm |
| FOV | 116° (B); 116°*90° (Volume scan) |
| FOV (Wide Sector) | 144° (B), 144° x 90° (Volume scan) |
| Foot Print | 26.7 x 22.9 mm |
| Depth | Max. 18cm |
| Biopsy Guide Available | PEC 76, Single-Angle, Reusable and Disposable |

RRE6-10-D

| | |
|-------------------------------|------------------------------------|
| Wide Band Convex Volume Probe | |
| Number of Elements | 192 |
| Applications | GYN, Urology |
| Maximum Band Width (-20dB) | 4.0 – 9.0 MHz |
| Convex Radius | 11.7 mm |
| Volume Sweep Radius | 11.7 mm |
| FOV | 146° (B), 146°*135° (Volume scan) |
| FOV (Wide Sector) | 206° (B), 206° x 85° (Volume scan) |
| Foot Print | 29.9 x 32.6 mm |
| Depth | Max. 12cm |
| Biopsy Guide Available | PEC 69, Single-Angle |

RRE5-10-D

| | |
|-------------------------------|-----------------------------------|
| Wide Band Convex Volume Probe | |
| Number of Elements | 192 |
| Applications | Gynecology, Urology |
| Maximum Band Width (-20dB) | 4.0 – 9.0 MHz |
| Convex Radius | 11.7 mm |
| Volume Sweep Radius | 12.2 mm |
| FOV | 147° (B), 147°*135° (Volume scan) |
| FOV (Wide Sector) | 206° (B), 206°*135° (Volume scan) |
| Foot Print | 23.6 x 24.9 mm |
| Depth | Max. 16 cm |
| Biopsy Guide Available | PEC 84, Single-Angle |

3S-D

| | |
|------------------------------|---|
| Wide Band Phased Array Probe | |
| Number of Elements | 64 |
| Applications | Abdominal, Cardiology, Pediatrics, Neurology, OB |
| Maximum Band Width (-20dB) | 1.0 – 3.0MHz |
| FOV | 90° |
| Foot Print | 27.6 x 19.3 mm |
| Depth | Max. 24cm |
| Biopsy Guide Available | 3S, Multi-Angle, disposable with reusable bracket |

Probes (cont.)

3Sp-D

| | |
|------------------------------|--|
| Wide Band Phased Array Probe | |
| Number of Elements | 64 |
| Applications | Abdominal, Cardiology, Pediatrics, Neurology, OB |
| Maximum Band Width (-20dB) | 1.0 – 5.0MHz |
| FOV | 90° |
| Foot Print | 23.4 x 20.2 mm |
| Depth | Max. 24 cm |
| Biopsy Guide Available | Multi-Angle, disposable with reusable bracket |

PA 6-8-D

| | |
|------------------------------|-----------------------------------|
| Wide Band Phased Array Probe | |
| Number of Elements | 128 |
| Applications | Abdominal, Cardiology, Pediatrics |
| Maximum Band Width (-20dB) | 4.0 – 10.0 MHz |
| FOV | 90° |
| Foot Print | 22.0 x 11.8 mm |
| Depth | Max. 14 cm |

P2-D

| | |
|-------------------------|--|
| CW Doppler Pencil Probe | |
| Number of Elements | 2 |
| Applications | Cardiology, Peripheral Vascular, Neurology |
| Center Frequency | 2.0MHz |
| Foot Print | diam.: 17 mm |
| Biopsy Guide Available | Not available |

P6-D

| | |
|-------------------------|---------------------------------|
| CW Doppler Pencil Probe | |
| Number of Elements | 2 |
| Applications | Cardiology, Peripheral Vascular |
| Center Frequency | 6.0 MHz |
| Foot Print | diam.:9mm |
| Biopsy Guide Available | Not available |

External Inputs and Outputs

Connectivity on rear panel (direct access)

- VGA Out
- Network (RJ45)
- Wireless Network interface (USB) (Option)
- USB (6x)
- S-Video Out 1

Connectivity behind rear panel (access after opening):

- DVI-D out
- S-Video Out 2 (VTR)
- S-Video In (VTR)
- S-Video Out 1
- Audio Out
 - Left/right
- Audio In
 - Left/right
- USB (5x internal)
- RS 232:Optional, USB to RS232 converter
- Parallel Port
- Ext. Device/Remote Connections:
 - Remote BW Printer via USB
 - Remote Color Printer/DVR via USB
 - Remote VCR (RS232) /DVR via USB
 - Remote Printer via Bluetooth Connection Kit (Option)
 - Footswitch via USB
 - ECG

Safety Conformance

The Voluson E8 Expert is:

NRTL certified according UL 60601-1 (TÜVPS)

Certified to CSA 22.2, 60601.1 by an SCC accredited Test Lab

CB-Test Report by National Certification Body

CE Marked to Council Directive 93/42/EEC on Medical Devices

Conforms to the following standards for safety:

EN 60601-1 General safety requirements for medical products

EN 60601-1-1 Particular requirements for electrical medical systems

EN 60601-1-2 Electromagnetic compatibility

EN 60601-1-4 Programmable medical systems

EN60601-1-6 Usability requirements for medical products

EN 60601-2-37 Particular requirements for the safety of ultrasound medical diagnostic and monitoring equipment

IEC 601157 Declaration of acoustic output

ISO 10993 Biological evaluation of medical devices

NEMA UD3 Acoustic output display (MI, TIS, TIB, TIC)

WEEE (Waste Electrical and Electronic Equipment)

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imagination at work

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