

5. Transducers

5.1 Transducer selection

- Electronic switching of transducers using four universal connectors
- Dedicated (Pedoff) continuous wave Doppler connector is available
- Automatic parameter optimization of each transducer for exam type through Tissue Specific Presets (TSP) software
- If two transducers are connected that both support the same TSP, the system supports instantaneous switching between transducers while maintaining current depth parameter if possible
- User-customizable imaging presets for each transducer
- Automatic dynamic receive focal optimization
- Transmission of focal characteristics automatically controlled through TSP, focal control and DRS functions

Compact transducers

- Ergonomic designs with lightweight super-flexible cables
- Fully contained pinless style direct electrical contact points
- Advanced low-loss lens technology for penetration with less artifacts
- Breakthrough broadband frequency response
- Support for very high frequencies from skin line (with zoom function) to 30 cm
- Advanced micro-electronics in linear, curved, tightly curved, sector and hybrid volume array configurations
- High-precision automated volume transducers

PureWave crystal technology

- Available on the eL18-4, X7-2t, X8-2t*, S5-1, C5-1 and C9-2 transducers
- Breakthrough crystal technology that allows greater acoustic efficiency and bandwidth

xMATRIX technology

- Available on the X5-1, X7-2t and X8-2t* transducers
- Unique array configuration of fully sampled elements that allows 2D, Live xPlane and volume imaging

Curved array

C5-1 broadband curved array

with PureWave crystal technology

- 5 to 1 MHz extended operating frequency range
- End-fire sector, 45 mm radius of curvature, 111° field of view (wide scan enabled)
- High density curved array with 160 elements
- Steerable pulsed, High-PRF and color Doppler, and Color Power Angio (CPA), directional CPA, SonoCT, variable XRES, XRES Pro and multivariate harmonic imaging
- General purpose abdominal (adult and pediatric, including vascular), bowel and interventional applications
- Intervention application
- Contrast mode
- Supports biopsy guide capabilities
- Precision biopsy support compatible with CIVCO Verza Guidance System

• Currently not approved in all countries.
• CIVCO Verza Guidance System is a trademark of CIVCO Medical Solutions

C6-2 broadband curved array

- 6 to 2 MHz extended operating frequency range
- End-fire sector, 50 mm radius of curvature, 72° field of view (wide scan enabled)
- High density curved array with 128 elements
- Steerable pulsed, High-PRF and color Doppler, and Color Power Angio (CPA), directional CPA, SonoCT, variable XRES and multivariate harmonic imaging
- General purpose abdominal (adult and pediatric, including vascular), bowel and interventional applications
- Intervention application
- Contrast mode
- Supports biopsy guide capabilities

C8-5 broadband curved array

- 8 to 5 MHz extended operating frequency range
- End-fire sector, 14 mm radius of curvature, 122° field of view (wide scan enabled)
- Steerable pulsed wave and color Doppler, Color Power Angio (CPA), directional CPA, SonoCT and XRES imaging
- Vascular, pediatric abdominal and neonatal cephalic imaging
- Supports biopsy guide capabilities

C9-2 broadband curved array

with PureWave crystal technology

- 9 to 2 MHz extended operating frequency range
- End-fire sector, 45 mm radius of curvature, 102° field of view (wide scan enabled)
- Steerable pulsed wave and color Doppler, Color Power Angio (CPA), directional CPA, SonoCT, variable XRES, and harmonic imaging
- General purpose small adult and pediatric abdominal applications
- Contrast mode
- Supports biopsy guide capabilities (4 angle)
- Precision biopsy support compatible with CIVCO Verza Guidance System

Linear array

eL18-4 ultra-broadband linear array

with PureWave crystal technology

- Ultra-broadband PureWave array generates frequencies from 2 to 22 MHz
- Multi-row array with fine elevation focusing
- Optimized diagnostic operating bandwidth 18-4 MHz
- Fine pitch, 1920 active elements
- Steerable pulsed wave and color Doppler, Color Power Angio (CPA), SonoCT, variable XRES and harmonic imaging
- High resolution superficial applications including vascular, bowel and pediatric imaging
- MicroFlow Imaging support
- Needle visualization support
- Auto Doppler flow optimization
- Contrast mode
- Panoramic Imaging
- High frame rates available
- Precision biopsy support compatible with CIVCO Verza Guidance System

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L12-3 broadband linear array

- 12 to 3 MHz extended operating frequency range
- Fine pitch, 160 element, high resolution linear array
- Steerable pulsed wave and color Doppler, Color Power Angio (CPA), SonoCT, panoramic, variable XRES, XRES Pro and harmonic imaging
- Fine angle steering of color and pulsed wave Doppler
- Vascular (carotid, arterial and venous), Intervention and bowel applications
- Cerebrovascular (carotids, vertebrales), peripheral vascular (venous, arterial) and internal mammary vessels imaging
- Surgical application
- Auto Doppler flow optimization
- Supports biopsy guide capabilities
- Precision biopsy support compatible with CIVCO Verza Guidance System

L12-3ERGO broadband linear array

- 12 to 3 MHz extended operating frequency range
- Fine angle steering of color and pulsed wave Doppler
- 2D, steerable pulsed wave and color Doppler, Color Power Angio (CPA), SonoCT, variable XRES, XRES Pro, harmonic imaging, M-mode, MicroFlow Imaging and Directional CPA Vascular (carotid, surgical, arterial and venous) and superficial imaging applications
- Cerebrovascular (carotids, vertebrales), peripheral vascular (venous, arterial) and internal mammary vessels imaging
- Surgical applications
- Auto Doppler flow optimization

L12-4 broadband linear array

- 12 to 4 MHz extended operating frequency range
- Fine pitch, 128 element, high resolution linear array
- Steerable pulsed wave and color Doppler, Color Power Angio (CPA), SonoCT, panoramic, variable XRES, and harmonic imaging
- Fine angle steering of color and pulsed wave Doppler
- Vascular (carotid, arterial and venous), Intervention and bowel imaging applications
- Cerebrovascular (carotids, vertebrales), peripheral vascular (venous, arterial) and internal mammary vessels imaging
- Surgical application
- Auto Doppler flow optimization
- Supports biopsy guide capabilities

L12-5 50 broadband linear array

- 12 to 5 MHz extended operating frequency range
- Fine pitch, 256 element, high resolution linear array
- Steerable pulsed wave and color Doppler, Color Power Angio (CPA), SonoCT, variable XRES and harmonic imaging
- High resolution superficial applications including vascular and bowel imaging
- Auto Doppler flow optimization
- Contrast mode
- Panoramic imaging
- Pediatric application
- High frame rates available
- Supports biopsy guide capabilities
- Precision biopsy support compatible with CIVCO Verza Guidance System

L15-7io broadband compact linear array

- 15 to 7 MHz extended operating frequency range
- Fine pitch, 128 element, high resolution linear array
- Steerable pulsed wave and color Doppler, Color Power Angio (CPA), SonoCT, panoramic and XRES imaging
- Unique lens design allowing high resolution imaging at transducer surface
- High resolution intraoperative vascular and epiaortic applications
- Auto Doppler flow optimization
- Fine angle steering of color and pulsed wave Doppler

L18-5 broadband linear array

- 18 to 5 MHz extended operating frequency range
- Ultra-fine pitch, 288 element, high resolution linear array
- Steerable pulsed wave and color Doppler, Color Power Angio (CPA), SonoCT, panoramic, variable XRES, and harmonic imaging
- High resolution superficial applications including vascular imaging
- Auto Doppler flow optimization
- Supports biopsy guide capabilities
- Precision biopsy support compatible with CIVCO Verza Guidance System

Sector array

S4-2 broadband sector array

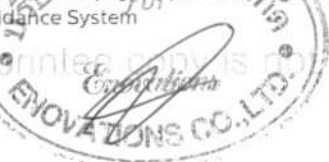
- 4 to 2 MHz extended operating frequency range
- Phased array, 80 elements
- 2D; CW, steerable pulsed wave, High-PRF and color Doppler, tissue Doppler, variable XRES, AutoSCAN/ISCAN and harmonic imaging
- Adult echo, abdominal, pediatric echo and TCD applications
- Contrast mode

S5-1 broadband sector array with PureWave crystal technology

- 5 to 1 MHz extended operating frequency range
- Phased array, 80 elements
- 2D; CW, steerable pulsed wave, High-PRF and color Doppler, tissue Doppler, variable XRES, AutoSCAN/ISCAN and harmonic imaging
- Adult echo, abdominal, pediatric echo and TCD applications
- Contrast mode, coronary color and PW Doppler

S7-3t sector array TEE

- 7 to 3 MHz extended operating frequency range
- Transesophageal sector array with 46 elements
- 2D, steerable PW Doppler, CW Doppler, color Doppler, variable XRES and harmonic imaging
- Physical dimensions:
 - Tip: 10.7 x 8 x 27 mm (0.42 x 0.31 x 1.1 in)
 - Shaft: 7.4 mm (0.29 in) diameter, 70 cm (27.6 in) L
- Manually rotatable array from 0° to 180°
- Pediatric and adult TEE applications, patients > 3.5 kg (7.7 lb)



S8-3 sector array

- 8 to 3 MHz extended operating frequency range
- Phased array, 96 elements
- 2D, steerable PW Doppler, CW Doppler, High-PRF Doppler, color Doppler, tissue Doppler, advanced variable XRES and harmonic imaging
- Adult, fetal and pediatric echo cardiac applications; pediatric abdominal, neonatal head application
- Coronary color and PW Doppler

S8-3t sector array TEE

- 8 to 3 MHz extended operating frequency range
- Transesophageal sector array with 32 elements
- Physical dimensions
 - Tip: 7.5 x 5.5 x 18.5 mm (0.3 x 0.2 x 0.7 in). WHL
 - Shaft: 5.2 mm (0.2 in) diameter, 88 cm (34.6 in) L
- Manually rotatable array from 0° to 180°
- 2D, steerable PW Doppler, CW Doppler, color Doppler, advanced XRES, M-mode and harmonic imaging
- Pediatric, including infants and adult TEE applications: patients > 2.5 kg (5.5 lb)

S12-4 sector array

- 12-4 MHz extended operating frequency range
- Phased array, 96 elements
- 2D, steerable PW Doppler, CW Doppler, High-PRF Doppler, color Doppler, tissue Doppler, advanced variable XRES and harmonic imaging
- Pediatric cardiac applications, neonatal head application
- Coronary color Doppler

xMATRIX array

X5-1 xMATRIX array with PureWave crystal technology

- 5 to 1 MHz extended operating frequency range
- 3,040 elements with microbeamforming
- Ergonomic xMATRIX handle with lightweight cable
- Shorter length for easy apical fit
- Extended cable length
- Single ASIC architecture
- iRotate – rotatable scan angle from 0 to 360°
- 2D and Live xPlane imaging
- CW, steerable pulsed wave, High-PRF and color Doppler; tissue Doppler, variable XRES, AutoSCAN/ISCAN, and harmonic imaging
- Adult echo, abdominal, pediatric echo and TCD applications
- Contrast mode; coronary color and PW Doppler
- Physical dimensions
 - Dimensions: 9.2 x 3.9 x 2.9 cm (3.6 x 1.5 x 1.1 in) LWD with a shallow waist and push ridges for superb scanning comfort; the shortened 3D length helps to fit into the bed for apical views.
 - Lens: 17 x 2.3 cm (0.67 x 0.9 in)
- Green label approved transducer (environmental improvement measure)

X7-2t xMATRIX array TEE with PureWave crystal technology*

- 7 to 2 MHz extended operating frequency range
- Transesophageal xMATRIX array transducer with 2,500 elements
- 2D, advanced variable XRES, harmonic imaging, M-mode, color M-mode, color flow, PW Doppler, CW Doppler, Live xPlane imaging, Live 3D Echo, Live 3D zoom, 3D zoom color, 3D zoom color preview, two-volume view, triggered full volume and triggered 3D color volume
- Physical dimensions:
 - Tip: 1.7 x 3.8 cm (0.7 x 1.5 in) WxL
 - Shaft: 1 cm (0.4 in) diameter, 1 m (39.4 in) L
- Electronically rotatable array from 0° to 180°
- Electrocautery suppression
- Adult TEE applications: patients > 30 kg (66 lb)

X8-2t* xMATRIX array TEE with PureWave crystal technology

- 8 to 2 MHz extended operating frequency range
- Fully sampled matrix phased array with 2,500 elements
- Triple-high line density in live volume and full volume modes
- User programmable button can be configured for freeze/ISCAN or acquire controls
- Adult TEE applications: patients > 30 kg (66 lb)
- Physical dimensions:
 - Tip: 1.7 x 3.8 cm (0.7 x 1.5 in) WxL
 - Shaft: 1 cm (0.4 in) diameter, 1 m (39.4 in) L
 - Electronically rotatable array from 0 to 180°
 - Electrocautery suppression
- 2D, advanced XRES, harmonic imaging, M-mode, color M-mode, color flow, PW Doppler, CW Doppler, TDI, TDI PW, Live xPlane imaging, Live xPlane PW/CW Doppler, Live 3D Echo, Live 3D zoom, 3D zoom color, 3D zoom color preview, two-volume view, triggered full volume and triggered 3D color volume

Non-imaging

D5cwc CW transducer (Pedoff)

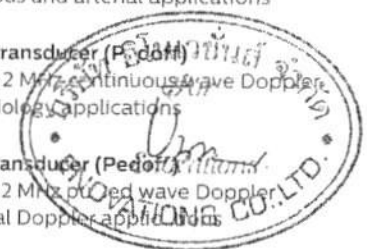
- Dedicated 5 MHz continuous wave Doppler
- Deep venous and arterial applications

D2cwc CW transducer (Pedoff)

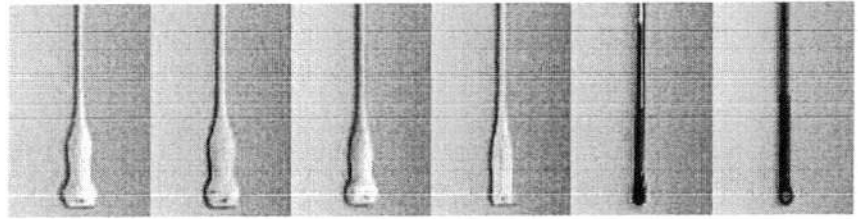
- Dedicated 2 MHz continuous wave Doppler
- Adult cardiology applications

D2tcd PW transducer (Pedoff)

- Dedicated 2 MHz pulsed wave Doppler
- Transcranial Doppler applications

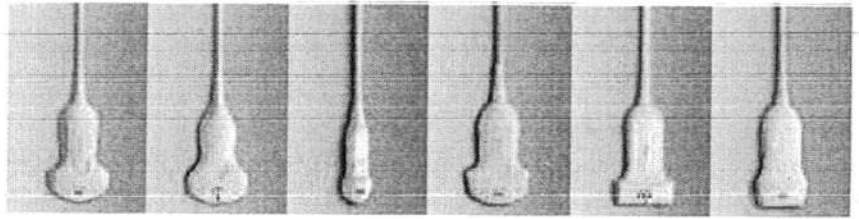


5.2 Transducer application guide



Transducer	S4-2	S5-1	S8-3	S12-4	S7-3t	S8-3t
Type of array	Sector	Sector	Sector	Sector	Sector	Sector
Number of elements	80	80	96	96	48	32
Scanplane aperture	20.3 mm	20.3 mm	15.4 mm	9.78 mm	5 mm	4.76 mm
Field of view	90°	90°	90°	90°	90°	90°
WideSCAN available						
Volume field of view						
Broadband frequency range	4-2 MHz	5-1 MHz	8-3 MHz	12-4 MHz	7-3 MHz	8-3 MHz
PureWave technology		*				
Application	Exam type					
Abdominal	General					
	Renal					
	Bowel					
	Vascular	*	*			
	Penetration					
	Resolution					
Fetal	Early fetal heart					
	Fetal heart			*		
Cardiology	Adult	*	*	*	*	*
	Pediatric	*	*	*	*	*
	Epicardial					
	Epi-aortic					
Vascular	Carotid					
	Arterial					
	Venous					
	TCD	*	*			
	Intraoperative					
	Intervention					
Pediatric	Superficial					
	Abdomen			*	*	
	Hip			*	*	
Biopsy guide	Neonatal cephalic			*	*	
		*	*			



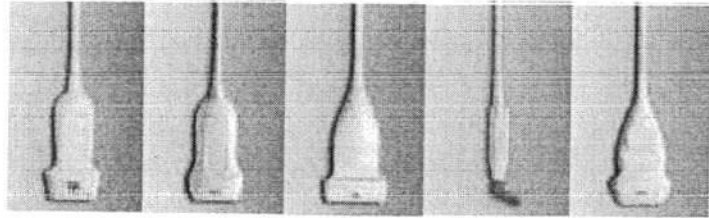


Transducer	C5-1	C6-2	C8-5	C9-2	eL18-4	L12-3
Type of array	Curved	Curved	Tightly curved	Curved	Linear	Linear
Number of elements	160	128	128	192	1920	160
Scan plane aperture	55.5 mm	63.7 mm	22.4 mm	53.76 mm	50 mm	38 mm
Field of view	111°	72°	122°	102°		
WideSCAN available					•	•
Volume field of view					•	
Broadband frequency range	5-1 MHz	6-2 MHz	8-5 MHz	9-2 MHz	2-22 MHz	12-3 MHz
PureWave technology	•			•	•	
Application	Exam type					
Abdominal	General	•	•		•	
	Renal	•	•		•	
	Bowel	•	•		•	•
	Vascular	•	•		•	
	Penetration	•	•		•	
	Resolution	•			•	
	Intervention	•	•			
Fetal	Early fetal heart			•		
	Fetal heart	•	•	•	•	
Cardiology	Adult					
	Pediatric					
	Epicardial					
	Epi-aortic					
Vascular	Carotid		•		•	•
	Arterial		•		•	•
	Venous				•	•
	TCD					
	Intraoperative					
	Intervention					•
	Superficial					•
Pediatric	Abdomen	•	•	•	•	•
	Hip				•	•
	Neonatal cephalic			•		•
Biopsy guide	•	•	•	•		•



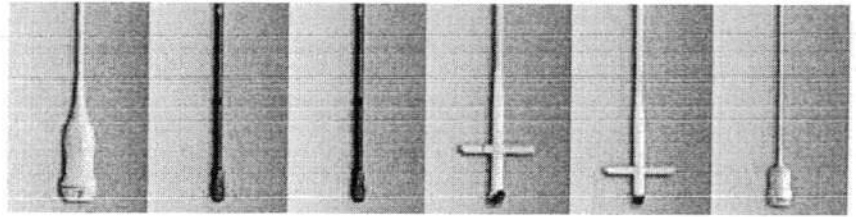
5.2 Transducer application guide

(continued)



Transducer		L12-3ERGO	L12-4	L12-5	L15-7io	L18-5
Type of array		Linear	Linear	Linear	Linear	Linear
Number of elements		160	128	256	128	288
Scanplane aperture		38 mm	34 mm	50 mm	23 mm	38.9 mm
Field of view						
WideSCAN available		•	•	•	•	•
Volume field of view						
Broadband frequency range		12-3 MHz	12-4 MHz	12-5 MHz	15-7 MHz	18-5 MHz
PureWave technology						
Application	Exam type					
Abdominal	General					
	Renal					
	Bowel	•	•	•		
	Vascular					
	Penetration					
	Resolution					
Fetal	Early fetal heart					
	Fetal heart					
Cardiology	Adult					
	Pediatric				•	
	Epicardial				•	
	Epi-aortic				•	
Vascular	Carotid	•	•	•	•	•
	Arterial	•	•	•	•	•
	Venous	•	•	•	•	•
	TCD				•	•
	Intraoperative				•	
	Intervention	•	•	•	•	•
	Superficial	•	•	•	•	•
		•	•	•	•	•
Pediatric	Abdomen	•	•	•	•	•
	Hip	•	•	•	•	•
	Neonatal cephalic	•	•	•	•	•
Biopsy guide		•	•		•	

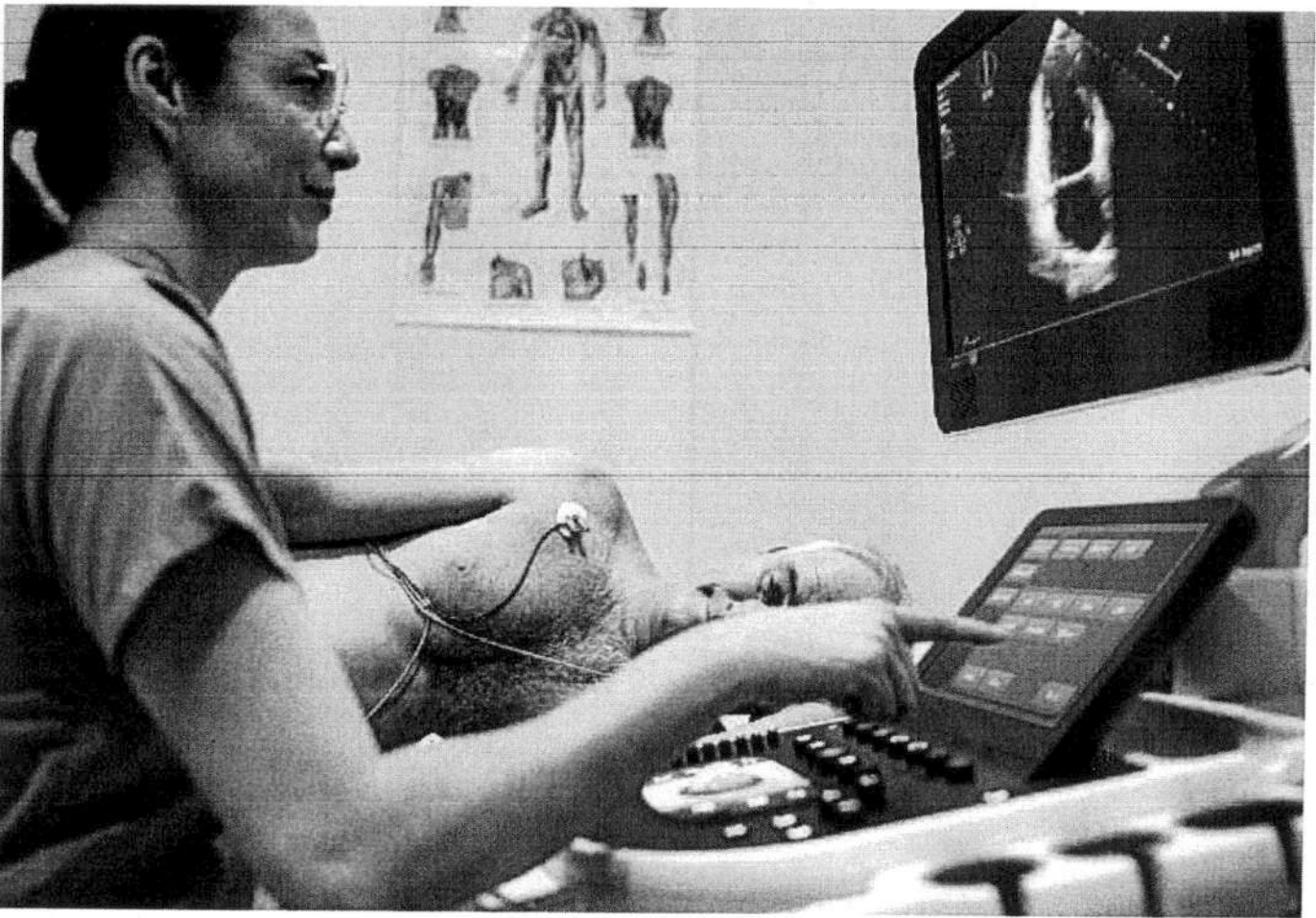




Transducer		X5-1	X7-2t	X8-2t	D2cwc	D5cwc	D2TCD
Type of array		xMATRIX	xMATRIX	xMATRIX			
Number of elements		3040	2500	2500			
Scanplane aperture		Proprietary	Proprietary	Proprietary			
Field of view		90°	90°	90°			
WideSCAN available							
Volume field of view		98° x 98°	86° x 86°	105 x 105			
Broadband frequency range		5-1 MHz	7-2 MHz	8-2 MHz			
PureWave technology		•	•	•			
Application	Exam type						
Abdominal	General						
	Renal						
	Bowel						
	Vascular	•					
	Penetration						
	Resolution						
	Intervention						
Fetal	Early fetal heart						
	Fetal heart						
Cardiology	Adult	•	•	•	•		
	Pediatric	•					
	Epicardial						
	Epi-aortic						
Vascular	Carotid					•	
	Arterial					•	
	Venous					•	
	TCD	•					•
	Intraoperative						
	Intervention						
	Superficial						
Pediatric	Abdomen						
	Hip						
	Neonatal cephalic						

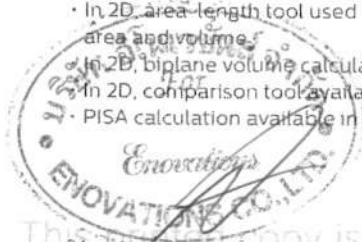


6. Measurements and analysis



6.1 Measurement tools and general description

- 2D distance
- 2D circumference/area by ellipse, continuous trace, trace by points
- Auto conversion of distance to ellipse
- 2D curved-linear distance
- 2D angle: intersection of two lines
- In 2D, three distance or distance and ellipse tools to calculate volume
- In 2D, hip angle tool and d,D ratio tool
- In 2D, percent area reduction and percent diameter reduction tools
- In 2D, Simpson tool calculate LV (left ventricle) area and volume
- In 2D, area-length tool used to calculate LA (left atrium) area and volume
- In 2D, biplane volume calculation
- In 2D, comparison tool available in contrast applications
- PISA calculation available in cardiac applications
- 3D: ellipse and distance on 2 MPR views
- 3D: stacked contours on one MPR
- M-mode distance (depth, time slope)
- M-mode heart rate calculation
- Manual Doppler distance
- Auto conversion of distance to ellipse
- 2D trace by points
- 2D distance (micro caliper)
- 2D Simpsons
- Generic angle
- 3 distance volume
- Distance and ellipse volume
- Diameter percent reduction
- Area percent reduction
- Hip angle
- d:D ratio
- Size compare
- Doppler peak velocity



- Doppler two calipers tool
- Doppler continue trace
- Doppler trace by points
- Cardiac dp/dt
- Volume flow
- Color aliasing velocity
- Manual data entry
- RA pressure
- 3D stacked ellipses
- 3D auto stacked contours
- Manual Doppler trace
 - Cardiac trace tool generates Vmean, Vmax, MeanPG, MaxPG, VTI
 - General imaging trace tool generates PSV (peak-systolic velocity), EDV (end diastolic velocity), MDV (minimum diastolic velocity), TAPV (time averaged peak velocity), TAMV (time averaged mean velocity), RI (resistive index), PI (pulsatility index), S/D (systole/diastole) ratio, and heart rate
- Time/slope measurements in Doppler and M-mode
- High Q automatic Doppler analysis (general imaging only)
 - Automatically calculates PSV, EDV, MDV, TAPV, TAMV, RI, PI, S/D ratio and heart rate
 - Functions in live or frozen imaging
- RA (right atrium) systolic pressure tool

6.2 Measurement tools and quantification

QLAB quantification software

Cardiac 3D Quantification (3DQ)

- On-cart and off-cart access
- Customize capabilities via optional plug-ins
- Capable of performing 2D measurements from 3D volume and, 3D color volume multiplanar reconstruction (MPR) views
- Review and quantification of Live 3D, 3D zoom, 3D full volume and color full volume files
- 3D image controls 3D vision map, 3D single or dynamic colorization, 3D color render, 3D color suppress control
- Multiplanar reconstruction (MPR) views
 - 3D slice plane
 - Parallel plane
 - Unlimited MPR manipulation
 - Plane rotation, tilt, movement controls to reduce left ventricle foreshortening
- 3D annotation
- 3D spatial reference icon
- Cardiac 3D measurements, 3D quantification from MPR views includes the following measurements
 - Distance
 - Area
 - Biplane LV volume (Simpson's)
 - Biplane LV ejection fraction
 - Biplane LV mass

Cardiac 3D Quantification Advanced (3DQ Advanced)

- Left ventricle global and regional volume and timing analyses with no geometric assumption
- Comprehensive report page with AHA/ASE 17-segment bull's-eye plots and numeric values
- Image quality index using dedicated color scale for 3D volume quality control
- Display and manipulation of dynamic 3D rendering and left ventricular (LV) true volumes of Live 3D data sets
- Displays of 3D or dynamic 3D renderings in grayscale, single colorization, or dynamic colorization
- Multiplanar reconstruction (MPR) views
- Option to flip LV apical two-chamber display and corresponding septal, anterior, lateral, inferior (SALI) sequence
- iSlice display-compatible
- Measurements of LV endocardial true 3D volumes, LV ejection fraction and stroke volume using semi-automated 3D border detection
- Computation of regional volumes based on AHA/ASE 17-segment LV model
- Edit mode that adds flexibility for optimal 3D border tracking in four dimensions
- Display of global LV volume waveforms, all 17 regional volume waveforms, or a subset of user-selected regional volume waveforms
- Displays of dyskinetic segments and corresponding volume waveforms in specific color and format
- Display of regional end-diastolic normalized regional volume waveforms
- User-selectable waveforms: single, by wall, by level (ring) modes
- A bull's-eye visualization of all 17 regional segments or the user-defined and user-selected regional segments
- Global and regional reports that provide 3D LV global values and regional timing indices from all or a subset of 17 regional segments and bull's-eye-based parametric imaging display
 - 3D true volume-based EDV, ESV, stroke volume and EF
 - Standard deviation and maximal difference of time to minimum systolic volume (Tmsv) based on all or a subset of 17 regional segments
 - Tmsv values displayed in time (msec) or normalized to the R-R interval
 - Bull's-eye showing the user-selected segments for time to minimum systolic volume (Tmsv) calculation
 - LV timing and radial excursion parametric images in bull's-eye format using effective color-coded scales
 - Parametric imaging supporting AHA/ASE 17-segment overlay on the bull's-eye for direct and rapid visualization
 - Parametric imaging that provides a radial excursion threshold slider for selective visualization of LV segments in the timing parametric display
 - Measurement data exported in Excel or DICOM SR formats



Mitral Valve Navigator^{AI} (MVN^{AI})

- 3D assessment of mitral valve anatomy and associated structures
- Review and quantification of Live 3D and full volume data sets from X7-2t, X8-2t* and xMATRIX transducer (Live 3D TEE)
- Task-driven workflow provides user direction and guidance illustrations
- Automated ES selection
- Automated 3D annulus segmentation and leaflet surface
- Associated 2D, 3D, and projected measurements and calculations sorted by group
 - Annulus
 - Leaflet
 - Aortic-Mitral
 - Coaptation
 - Papillary
- 3D image controls
 - 3D vision map
 - 3D single or dynamic colorization
 - Auto-view
 - Absolute and relative rotation
 - Three 3D render modes: volume, slices, model
- Multiplanar reconstruction (MPR) views
 - 3D slice plane
 - Unlimited MPR manipulation
 - Slice thickness
 - MPR smooth
- 3D mitral labels
- 3D mitral model
 - Model displays: tenting surface, leaflet surface, minimum surface
 - Enhanced coaptation line tracing
 - Leaflet discontinuity traces
 - Leaflet segmentation
 - Up to 53 measurements overlay
 - Exposed and coapted leaflet length and surfaces
 - Continuous display during loop playback
- Mitral valve 3D measurements and 2D/3D quantification from model view include the following measurements
 - Distances
 - Curve distances
 - Areas
 - Projected areas
 - Volumes
 - Angles
 - Ratio
- Measurement and calculation definition and overlay on 3D model
- Comprehensive reporting
- Data exported in Excel or DICOM SR formats
- Measurement data exported in Excel or DICOM SR formats

TOMTEC 3D Auto MV

3D Auto MV helps to analyze the complex anatomy of the mitral valve in 3D as well as its dynamic mechanics during systole. The mitral valve anatomy and topology are visualized with a comprehensive static and dynamic model.

- Mitral valve analysis based on Live 3D echo data
 - Streamlined workflow with automated mitral valve orientation with annulus and leaflet detection
 - Manual review and the possibility to edit the automated model proposal
 - Comprehensive automatic measurements for annulus, leaflets and coaptation
 - Advanced edit options for definition and quantification of open coaptation regions
 - Automatic calculation of annular and leaflet dimensions
 - Definition and display of "Surgical View"
 - Dynamic tracking of MV structures through systolic phase
 - Export of automatically generated measurements
- Export of results to DICOM SR and/or .txt formats arranged in measurements groups
 - Annulus
 - Leaflets
 - Coaptation
 - Miscellaneous
 - Manual measurements
 - Dynamic measurements
- Supports export of the MV model in .stl or .obj format

3D Auto LAA

- 3D Auto LAA helps to quickly get left atrial appendage-related measurement from a 3D TEE data set.
- Requires proper MPR/MultiVue alignment before getting measurement
 - Provides automatic measurements of LAA landing zone/ostium: minimum and maximum axis, perimeter and area
 - Measurements are editable using global or local editing
 - Ability to quantify with and without EKG signal
 - Possibility to change MPR/MultiVue layout

Intima Media Thickness (IMT) Quantification plug-in

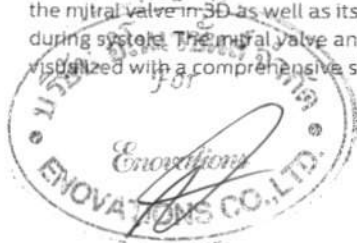
- Automated assessment of the IMT on user-selected frames
- For carotid and other superficial arteries

Region of Interest (ROI) Quantification plug-in

- Pixel intensity index – pixel intensity analysis, data types: echo, velocity
- Pixel intensity analysis, data types: echo, velocity (color) or power (angio)
- Up to 10 user-defined regions
- Thumbnail display of frames for easy trimming
- TDI velocity timing measurement
- Log/linear data display selection
- Smoothed data display with various curve fitting techniques
- Vascularization in text, HTML files and vascularization flow index results on color mode files
- Motion compensation for multiframe objects

Strain Quantification (SQ) plug-in*

- Tissue Doppler Imaging (TDI) velocity quantification
 - Used in the evaluation of regional myocardial function
- Measures the myocardial velocity from color TDI data set and derives the displacement, strain and strain rate along user-defined M-lines





- Cardiac phases display (overlay of AVO, AVC, MVO, and MVC mechanical events auto-imported from ultrasound cart analysis via DICOM SR or manual entry) on SQ curves for left ventricle mechanical events
- User-selectable waveform display that makes SQ curves easy to read
 - User-defined M-line motion to follow the myocardial motion
- Point of Interest (POI) tool that obtains values from any point on the M-mode display
- M-mode (hide or display) control
- User-defined and automatic (using speckle tracking algorithms) M-line motion compensation to follow myocardial motion
- Able to present TDI results in two display formats
 - Anatomical M-mode display
 - Graph display
- User-selectable waveforms for optimal sub-region visualization
- Curve processing modes
- TDI velocity, displacement, strain and strain rate timing measurements with dedicated time calipers and labels
 - Automatic subdivision of M-line into a customizable number of sub-regions
 - Averages up to 20 cardiac beat cycles in both M-mode and graph displays

Automated Cardiac 2D Quantification^{AI} (a2DQ^{AI}) and a2DQ^{AI} LA*

- Left ventricle and left atria global volume analysis from 2D and biplane images
- Quantification of native and non-native images
- Quantification of non-ECG images
- Automated border detection for cardiac chambers and vessel cavities

- Computation of area, LV volumes and advanced parameters for LV systolic and diastolic function including fractional area change (FAC), ejection fraction (EF), peak ejection rate (PER), peak rapid filling rate (PRFR) and atrial filling fraction (AFF)
- Computation of LA area, volumes and advanced parameters including fractional area change (FAC) and ejection fraction (EF)
- Single-plane volume measurements based on Simpson's Single Plane Method of Disks (MOD)
- Biplane volume measurements based on Simpson's Biplane Method of Disks (MOD)
- Automated Tissue Motion Annular Displacement (aTMAD)
 - Mitral valve and other valve annular motion tracking over time
 - Computation of valve annular displacement curves over time
 - Color Kinesis overlay to visualize valve annular plane motion parametrically
 - Measurement data exported in Excel or DICOM SR formats
 - Simplified workflow with SmartExam

Automated Cardiac Motion 2D Quantification^{AI} (aCMQ^{AI})

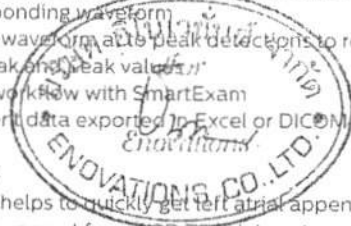
- Automated Region of Interest for selected anatomical views
- Objective assessment of left ventricle global function and regional wall motion, deformation and timing using the next generation of 2D speckle tracking technology
- File compatibility
 - Quantification of 2D native and non-native ultrasound DICOM images
 - Quantification of non-ECG images
- Available methods with dedicated preferences settings
 - Global workflow
- Latest generation of 2D speckle tracking technology
- Auto ROI can be set either on ED or ES frame
- Automated border detection for cardiac chambers and vessel cavities
- Auto aortic valve closure time detection
- Smooth color transitioned bull's-eye presentation
 - Multiple cardiac view/images capable
 - 18 or 17 left ventricle segmentation templates (three apical views and three short-axis view templates)
 - Easy-to-edit template position and shape
 - Intuitive step-by-step user interface
 - Tracking quality control by right clicking the segment to remove the poorly tracked segment
 - User-editable post LV segments display consistent display with corresponding waveform and reported values beat-to-beat
- Display
 - Border (hide or show)
 - Image ROI Overlay (hide or show)
 - Cardiac phases (overlay of AVO, AVC, MVO and MVC mechanical events auto-imported from ultrasound cart analysis via DICOM SR or manual entry)
 - Four up display
- 2D speckle parameters

*Not available in all countries.



- Volume/EF and area/FAC
- Longitudinal strain and strain rate
- Circumferential strain and strain rate
- Radial and transversal displacement
- Radial fractional shortening
- Radial velocity
- Speed (absolute angle independent velocity)
- Regional rotation and rotation velocity
- Global rotation (SAX)
- Endo-Epi mural torsion and local rotation
- Measurement and calculations
 - Selectable GLS measurement points: peak, peak-systolic and end-systolic
 - Time-to-peak and peak values
 - Timing caliper
 - Global result display one view and global result display
 - Results display in 18 or 17 LV segment bull's-eye plot format and numerical table
 - Layer specific (Endo, Mid and Epi) longitudinal strain per view and global longitudinal strain

- Circumferential strain per view and global circumferential strain
- User-defined workflow for specific local strain analysis
- Up to 18 dedicated colors to help differentiate each cord and corresponding waveform
- Up to three waveform auto peak detections to report time-to-peak and peak values
- Simplified workflow with SmartExam
- Measurement data exported in Excel or DICOM SR formats



3D Auto LAA

- 3D Auto LAA helps to quickly get left atrial appendage-related measurement from a 3D TEE data set.
- Requires proper MPR/MultiVue alignment before getting measurement
 - Provides automatic measurements of LAA landing zone/ostium: minimum and maximum axis, perimeter and area
 - Measurements are editable using global or local editing
 - Ability to quantify with and without EKG signal
 - Possibility to change MPR/MultiVue layout



TOMTEC AutoStrain LV

- Provides automated 2D longitudinal strain quantification
- Objective assessment of left ventricle global function and regional wall motion deformation and timing using TOMTEC 2D speckle tracking technology
- One-button-push global longitudinal strain
- Automated view recognition and labeling with manual correction
- Automated contour detection and placement
- Image orientation selection
- Editing contour on ED and ES
- Fast speckle tracking on three apical images at once
- Peak longitudinal strain for each apical view and global average
- Automated R-AVC with manual correction
- 18 segments peak-systolic longitudinal strain bull's-eye display
- 18 segments end-systolic longitudinal strain bull's-eye display
- 18 segments time-to-peak longitudinal strain bull's-eye display
- 18 segments waveform display for three apical views
- 6 segments waveform display for each apical view
- Ability to de-select segments
- Highlighted global strain and strain rate curve display
- Measurement data exported in Report and DICOM SR

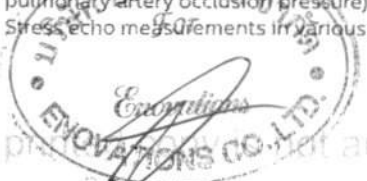
6.3 High Q automatic Doppler analysis

- Automatic real-time and retrospective tracing of:
 - Immediate peak velocity
 - Immediate intensity-weighted mean velocity
- Automatic real-time display of (user-selectable up to six):
 - Volume flow
 - Time-averaged peak velocity
 - Time-averaged mean velocity
 - Resistive index
 - Pulsatility index
 - Systolic/diastolic ratio
 - Acceleration/deceleration times
 - Illustrated High Q

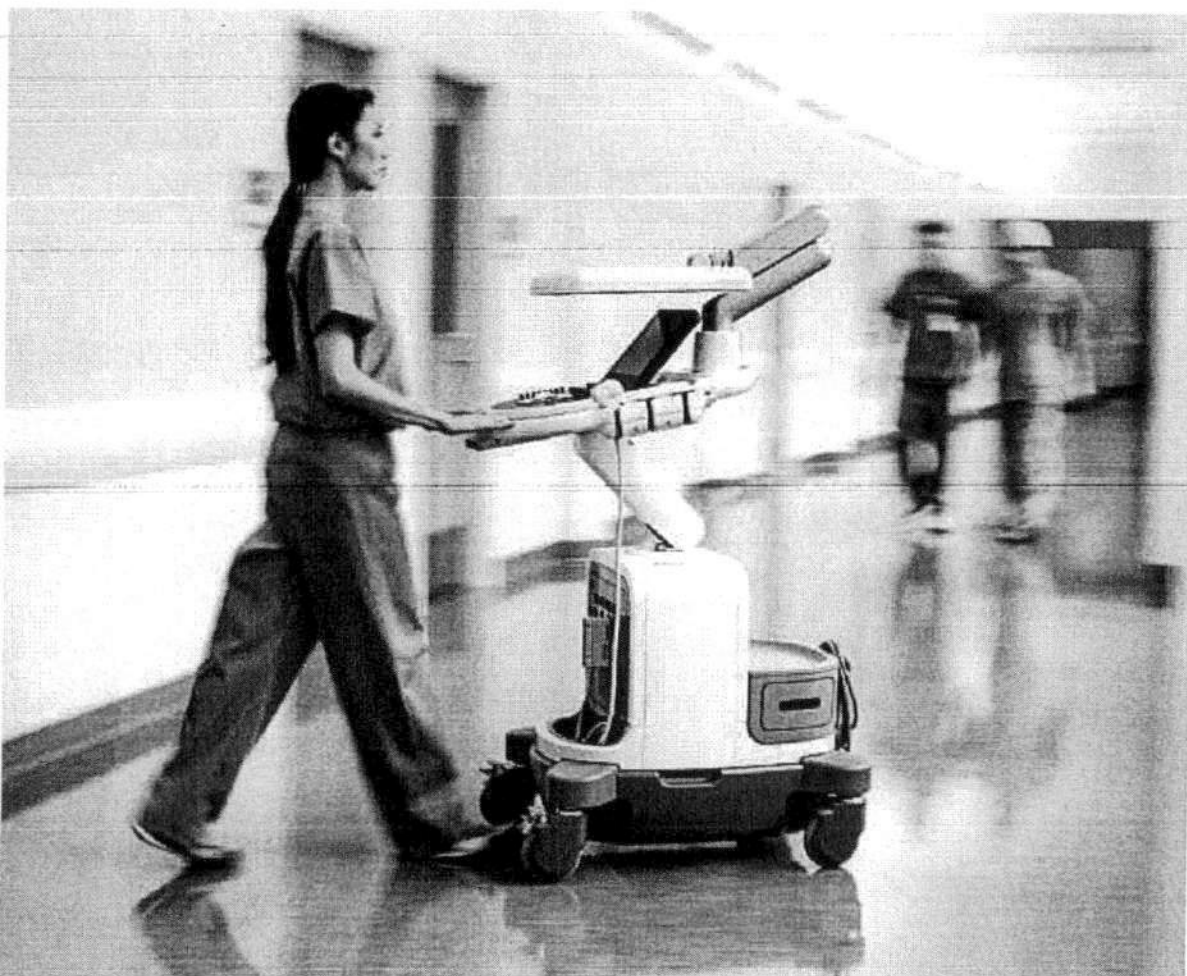
6.4 Clinical option analysis packages

- Cardiac analysis
 - Left atrium
 - Right atrium
 - Right ventricle
 - Left ventricle
 - TAVI (transcatheter aortic valve implantation)
 - Valve stenosis
 - Prosthetic aortic valve
 - Prosthetic mitral valve
 - TAPSE (tricuspid annular plane systolic excursion)
 - MAPSE (mitral annular plane systolic excursion)
 - PCWP (pulmonary capillary wedge pressure or pulmonary artery occlusion pressure)
 - Stress echo measurements in various stages

- MPI (or TEI index)
- Volume by area/length method
- M-mode ejection fraction (via Teichholz or cubed method)
- Novel 3-point adjustable Simpson's template
- Simpson's biplane and single plane volume and ejection fraction
- Area, length, volume and ejection fraction
- LV mass
- 2D all points
- M-mode all points
- Peak velocity
- Maximum and mean pressure gradients
- Pressure half time
- E/A ratio
- D/E slope
- Continuity equation
- Diastolic function
- Cardiac output
- Acceleration time
- Heart rate
- Vascular analysis
 - Right and left carotid artery protocols
 - ICA/CCA ratio
 - Bilateral lower extremity arterial and venous labels
 - Bilateral upper extremity arterial and venous labels
 - Percent diameter and area reduction
 - Vascular graft measurement package
 - User comments
 - High Q automatic Doppler analysis
- OB analysis
 - Fetal echo application
 - 2D echo
 - Fetal heart M-mode
 - Fetal Doppler
 - Fetal echo
- Abdominal vascular
 - Labels for all major abdominal arteries and veins
 - Left and right segmentation for kidneys
- Pediatric
 - General
 - d:D ratio



7. Physical specifications



System dimensions

Width	57.2 cm/22.5 in
Height	142.2-162.6 cm/56-64 in
Depth	98.3 cm/38.7 in
Weight	83.6 kg/184.4 lb without peripheral devices

System cart

- State-of-the-art ergonomic design for comfort and convenience
- Easy maneuverability and mobility
 - Wheel-lock and monitor adjustments that facilitate bedside exams
- Independent height adjustment of control panel and display monitor
- Easily accessed transducer connector ports, USB and DVD media drive
- Transducer and gel bottle holders

- Unique easy clip cable management solution that keeps cables tangle-free and reduces damage while decreasing cable strain to enhance comfort while scanning
- Mobility through high quality shock-absorbing casters with foot pedal controls for
 - 4-wheel swivel
 - 2-wheel swivel lock
 - 2-wheel brakes
- Integrated footrests
- Digitally enhanced two-speaker high fidelity stereo output with rear-mounted subwoofer
- On-board storage tray behind control panel touch screen and in rear bay storage drawer
- On-board printer bay that provides easy and ergonomic access to your printing device
- Universal peripheral bay that provides easy access for on-board hardcopy or documentation devices
- Built-in A/C line conditioner that provides isolation from voltage fluctuations and electrical noise interference
- Two high-capacity fans with decreased audible noise

Sustainability

The Affiniti CVx ultrasound system with improved functionality and ergonomics has compact imaging and processing core hardware, which allows for a reduced cart footprint and reduction in overall body size. The system shows significant reduction (37%) in power consumption* by a re-architected system design which requires fewer circuit boards and a more efficient power supply subsystem.



Energy

- On mode: 268 W
- Off mode: 6 W
- Energy usage/year*: 1008.9 kWh
- Power for battery charging: 24 W



Packaging

- Total weight: 51.5 kg
- Cardboard/paper: 13.4 kg
- Plastic: 2.3 kg
- Ferro metal: 0.6 kg
- Wood: 35.2 kg
- Certified wood: 100% SFI



Substances

- RoHS-2-compliant



Eco passport

- Philips Green Product

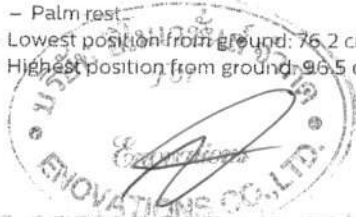
Monitor

2.4

- Flat panel LED display monitor
 - 54.6 cm (21.5 in) wide format high definition flat panel TFT/IPS display
 - High contrast ratio >1000:1
 - Extended viewing angle >178° (horizontal and vertical)
 - Response time: <14 ms
 - Virtually flicker-free technology
 - Mounted on fully articulating extension arm
 - Four-way articulation with 87.6 cm/34.5 in lateral and 17.8 cm/7 in vertical adjustment range
 - Nearly infinite positioning adjustments: height, swivel and tilt

Control panel

- Articulation facilitates nearly infinite positioning adjustments for optimum scanning ergonomics: height, swivel and tilt
 - Up and down 20.3 cm/8 in
 - Rotates 180° from center
 - Palm rest
- Lowest position from ground: 76.2 cm (30 in)
- Highest position from ground: 96.5 cm (38 in)



* Compared to its predecessor, HD11 XE

Physio

- One 3-lead ECG input
 - Gain, sweep rate and display position controls
 - Automatic heart rate calculation and display
 - Fault condition display
 - Cine-loop locator displayed on one ECG input from an ECG source like stress ECG or ECG monitor

Peripherals

- The system supports up to two on-board peripheral devices (excluding report printers)
 - Video-recording peripherals, operated via system user interface
 - DVD recorder (cart-dependent)
 - Small and large format digital B/W printers (USB)
- AI Breast
- Support for large format external B/W or color printer
- Support for various Hewlett-Packard, Epson and Xerox brand color and monochrome report printers (USB, externally mounted)

Input/output ports

- Export of measurement and analysis data to off-line reporting software packages (USB) and RS-232
- Display port video export available for either full screen resolution of 1920x1080 (1080p), display area 1024x768 VGA, or S-Video in NTSC or PAL format

Power requirements, video parameters

100V (240 V), 50 Hz/60 Hz – PAL/NTSC

Integrated A/C line conditioning and battery back-up system

- Power consumption: up to 450 watts

Electrical safety standards

- Electromechanical Safety Standards met
 - CAN/CSA 22.2 No. 60601-1, Medical Electrical Equipment: General requirements for basic safety and essential performance
 - IEC 60601-1, Medical Electrical Equipment: General requirements for basic safety and essential performance
 - IEC 60601-1-2, Collateral Standard, Electromagnetic compatibility requirements and tests
 - IEC 60601-2-37, Particular Requirements for the basic safety and essential performance of ultrasonic medical diagnostic and monitoring equipment
 - ANSI/AAMI ES60601-1, Medical Electrical Equipment: General requirements for basic safety and essential performance
- Electromechanical Safety Standards met (EU Only)
 - EN60601-2-37, Particular requirements for the basic safety and essential performance of ultrasonic medical diagnostic and monitoring equipment
- Agency approvals
 - Canadian Standards Association (CSA)
 - CE Mark in accordance with the European Medical Device Directive issued by British Standards Institute (BSI)

8. Maintenance and services

Maintenance

- Easy customer access to air filter for cleaning
- System designed for easy replacement of key components by your facility's biomedical engineers
- First responder access to diagnostics and utilities
- Flexible RightFit service agreements
 - Maximize uptime
 - Access Philips award-winning service organization
 - Minimize risk



Services*

Philips Remote Services Connectivity is designed with security in mind and allows for many advanced service features.

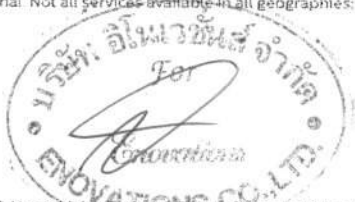
Security

Philips Remote services are based on a comprehensive security infrastructure including ISSL technology, encryption and protocols to protect patient information

Advanced service features

- Virtual on-site visits for both clinical and technical support, providing fast resolution to issues and questions
- Remote clinical education
- Remote log file transfer decreases downtime by allowing rapid diagnosis of problems by call center personnel
- Online Support Request
 - Simplifies support engagement
 - Provides fast response to clinical questions and technical issues
 - Allows request to be entered by user directly on ultrasound system
- Proactive monitoring
 - Helps prevent unscheduled downtime
 - Monitors key system parameters
 - Sends an alert to Philips Call Center so action can be taken before system operation is affected
- Remote Software Distribution boosts performance over the entire system lifecycle
- Clinical applications support available
- On-cart transducer test provides confidence in your transducer quality
- Optional Utilization Report provides data to help manage ultrasound assets
 - Track system and transducer usage
 - Summarize data about exam types and duration
 - Provide data to help with credentialing and privileging
 - Identify referrals by exam type
- Flexible Clinical Education offerings include:
 - Webinars
 - Symposiums
 - On-site
 - Classroom
 - Remote

* Optional. Not all services available in all geographies; contact your Philips representative for more information. May require service contract.



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Printed in the Netherlands
4522 991 62831 • SEP 2020

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PHILIPS

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เรื่อง แต่งตั้งผู้แทนจำหน่าย
เรียน ผู้เกี่ยวข้อง

ด้วยหนังสือฉบับนี้ บริษัท ฟิลิปส์ (ประเทศไทย) จำกัด ได้แต่งตั้ง บริษัท อีโนเวชั่นส์ จำกัด ตั้งอยู่เลขที่ 115 ซอยลาดพร้าว 126 ถนนลาดพร้าว แขวงพลับพลา เขตวังทองหลาง กรุงเทพฯ 10310 เป็นผู้แทนจำหน่ายผลิตภัณฑ์เครื่องมือแพทย์ของบริษัทฯ รวมทั้งให้บริการหลังการขาย ดังรายการต่อไปนี้

1. เครื่องอัลตราซาวด์ (Ultrasound) ยี่ห้อ PHILIPS ทุกรุ่น
2. เครื่องกระตุ้นหัวใจ ยี่ห้อ PHILIPS ทุกรุ่น
3. เครื่องช่วยหายใจ ยี่ห้อ PHILIPS ทุกรุ่น

โดยมีขอบเขตจำหน่าย และการให้บริการในเขตโรงพยาบาลทั่วประเทศไทย
หนังสือแต่งตั้งฉบับนี้ มีผลบังคับใช้ตั้งแต่วันที่ 31 มีนาคม 2568

จึงเรียนมาเพื่อทราบ

ขอแสดงความนับถือ
บริษัท ฟิลิปส์ (ประเทศไทย) จำกัด

ช.วิจิตร

(นายวิโรจน์ วิทยาเวโรจน์)
ผู้จัดการทั่วไป – Philips Health Systems



ระเบียบและข้อปฏิบัติของผู้ฝากเงิน

1. ผู้ฝากจะได้รับดอกเบี้ยตามอัตราและเงื่อนไขที่ธนาคารกำหนด
2. ในกรณีถอนเงินผู้ฝากต้องนำสมุดผู้ฝาก และบัตรประชาชน หรือบัตรประจำตัวข้าราชการ หรือบัตรประจำตัวอื่นๆ ของทางราชการมาแสดงและจะต้องปฏิบัติตามเงื่อนไขที่ให้ไว้กับธนาคาร
3. หากบัญชีไม่มีรายการเคลื่อนไหว และยอดเงินในบัญชีต่ำกว่าธนาคารกำหนด ธนาคารจะหักเงินจากบัญชีเพื่อชำระค่าธรรมเนียมการรักษานับบัญชี ตามเงื่อนไขของผลิตภัณฑ์ที่ธนาคารกำหนด และธนาคารจะดำเนินการปิดบัญชี
4. เช็ค ดราฟท์ หรือตราสารทางการเงินอื่นๆ ที่นำฝากเข้าบัญชี ธนาคารจะรับฝากไว้เพื่อการเรียกเก็บเท่านั้น การฝากเงินตามตราสารทางการเงินจะสมบูรณ์ และผู้ฝากสามารถเบิกถอนได้ภายหลังจากรับเงินคืนตามตราสารทางการเงิน ดังกล่าวเรียบร้อยแล้ว
5. ยอดเงินในสมุดผู้ฝากจะถือว่าถูกต้อง เมื่อธนาคารได้ตรวจสอบว่าตรงกับบัญชีของธนาคารแล้ว
6. กรณีผู้ฝากเปลี่ยนชื่อ ชื่อสกุล ที่อยู่ หรือสมุดผู้ฝากสูญหาย จะต้องแจ้งให้ธนาคารทราบทันที
7. ผู้ฝากจะแก้ไข เปลี่ยนแปลงหรือเพิ่มเติมข้อความและตัวเลขใดๆ ลงในสมุดผู้ฝาก หรือ โอน เปลี่ยนมือ หรือฉีกแผ่นหนึ่งแผ่นใดของสมุดผู้ฝากไม่ได้
8. ในกรณีสมุดผู้ฝากสูญหาย ผู้ฝากจะต้องแจ้งให้ธนาคารทราบด้วยตนเองเพื่อขอออกสมุดผู้ฝากเล่มใหม่
9. ระเบียบและข้อปฏิบัตินี้อาจเปลี่ยนแปลงได้ โดยจะประกาศให้ทราบ ณ ที่ทำการของธนาคาร
10. เงินฝากนี้ได้รับความคุ้มครองจากสถาบันคุ้มครองเงินฝากตามจำนวนที่กำหนดไว้ในกฎหมาย

tmb ธนาคารทหารไทยธนชาต จำกัด (มหาชน)
 TMBThanachart Bank Public Company Limited
 สาขา ชินทรี วิลล่า

บัญชีเลขที่ **216-2-22110-1**
 Account No.

ชื่อบัญชี **บจก. อีโนเวชั่นส์**
 Account Name

200-บัญชี ศัพท์ เมสิก



ผู้รับมอบอำนาจลงนามแทนธนาคาร
 Authorized Signature



สำเนาถูกต้อง

