# VINNO A6

## Ultrasound System Specifications

The premium performance of the full functional Portable A6 provides a fast and easy diagnosis by:

• Ultra-premium contrast and resolution imaging benefited from the first RF platform of the world
• All ranges of features, functions and probes
• Ease of use and ergonomic design

## System Overview

### Architecture

• The revolutionary RF platform, **The First In The World**, allows for more accurate information. This platform transfers all RF data for computing without any information loss. It has a much better advantage in detail imaging than current advanced platforms.
• Thanks to the RF platform, it allows the development of many RF-based processing algorithms, which have ultra-premium contrast and resolution imaging
• This unique platform is capable of processing multiple data streams simultaneously
• Directional-enhanced information compiling for more tissue detail and reduction of angle-generated artifacts
• Next generation adaptive image processing for noise and artifact reduction that improves tissue presentation and edge definition

• Fully independent, triplex multiple mode operation for easy in Doppler procedures
• Multi-processors allow simultaneous mode changes and support for advanced system functionality
• World-class design to be thinner and lighter
• First in class to introduce capacity touch panel in portable ultrasound system to simplify workflow and customized workflow possibility
• Less 50 sec boot up time for easy mobile ability

## Applications

• Abdomen
• Obstetric
• Gynecology
• Cardiology
• Urology
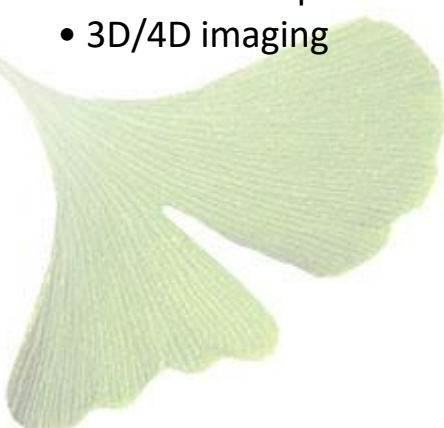• Vascular
• Small Parts
• Pediatrics

## Imaging features

• 2D grayscale imaging
• Harmonic imaging both in tissue harmonic and pulse inversion harmonic technologies
• VFusion, directional-enhanced information compounding
• VSpeckle , specialized and adaptive imaging processing to remove speckle noise artifacts and enhance tissue edge for clarity and accuracy
• VTissue, the advanced adaptive image processing to compensate for sound and speed variation in different tissue
• Auto imaging optimization
• Easy Comparative Function to compare previous exam
• M Mode imaging
• Color Doppler imaging
• Power Doppler imaging
• Pulse wave Doppler imaging
• Duplex 2D/PW Doppler
• Triplex 2D/Color/PW Doppler
• High PRF pulsed wave Doppler
• Continuous wave Doppler
• Zoom
• FULL screen imaging to enlarge imaging size
• Dual real time imaging without compromising imaging size
• PView for panoramic imaging (optional)*
• TView for trapezoidal imaging
• 3D/4D imaging

• Inversion mode(optional)*
• Magic cut(optional)*
• Multiline-Free view (optional)*
• Tomographic display (MCUT) (optional)*
• Volume Contrast Imaging(VCI)
• Niche view
• Three leads ECG function(optional) *
• Tissue Doppler (TD) mode(optional)*
• Multi-angle

(optional)*

## Standard features

• Up to 25Mhz high frequency in system platform.
• RF platform and RF data processing
• Up to 1500 seconds cine storage
• 120GB SSD quick boot up and storage
• Patient information database
• Image archive on hard drive
• Quick store to USB memory stick
• Quick store to hard drive
• Report package
• Quick print to B/W and color thermal video printer
• Network storage and printing
• Full measurement and analysis package
• Real time auto wave Doppler track and calculations

- Vascular calculations
- Cardiac calculations
- OB calculations and tables
- Gynecological calculations
- Urological calculations
- Renal calculations
- Volume calculations
- Wireless networking for easy data sharing, storage and printing*(optional)
- Up-to-date connectivity and data management solutions,  wireless , LAN, integrated database*(optional)
- Capability to send data to mobile by mail and blue tooth*(optional)
- Total mobile medical solution for remote data transfer and diagnostic
- DICOM compatibility*(optional)
- 2USB ports
- 8 TGC slides
- Average 4 multiple adjustable frequency in every probe and mode
- Up to 512 line density

## Ergonomics

- Unique human oriented design for comfort and convenience
- 15.6-inch high resolution flat panel display with nearly infinite positioning adjustments
- Easy to carry by integrated handle
- Three probe ports
- Easy detachable probe holder
- Cart support with lifing range up to 150mm *(optional)
- USB DVDRW *(optional)

## Keyboard

- Ergonomic hard keys for general ultrasound operations
- 8 TGC slides, functionality at any depth
- Backlight keys

## Image display screen

- 15.6 inch high resolution IPS, LED technology, pixel resolution
- Big angel tilting capability

## Peripherals

- B&W thermal video printer: Sony UP-D897MD (optional)
- Color thermal video printer: Sony UP-D25MD (optional)
- Memory stick (optional)

## Dimensions and Weight

- Length: 412mm
- Width:  390mm
- Depth:  85mm
- Weight: without accessories approx. 6.8kg

## Electrical Power

- Voltage: 100-240V AC
- Frequency: 50/60Hz
- Power: Max.170VA

# Transducers

## Transducer Technology

• Xcen technology for wideband frequency

## Transducer types

• Convex array
• Linear array
• Phase array
• 4D probe
• Endocavity probe

## Transducer selection

• Electronic switching of transducers
• User customizable imaging presets for each transducer and application
• Automatic dynamic receiving focus in all transducers
• Multiple adjustable transmit focal zone, up to 8 focal zoom

## A2-5C Broadband Curved Array

• Field of view: 59 degree
• Convex radius:  60mm
• Application: abdomen, ob/gyn, urology, pediatric
• Frequency range: 1.6 -5.3MHz
• Pulsed wave Doppler, color Doppler, power Doppler, harmonic
•Multi-imaging frequency setting in 2D, Harmonic, color Doppler and Wave Doppler modes
•Reusable biopsy guide available

## A3-6D broadband curved array volume probe

• Field of view: 75 degree
• Convex radius: 40mm
• Application: abdomen, ob/gyn, urology
• Frequency range: 1.8 – 6.3MHz
• Pulsed wave Doppler, color Doppler, power Doppler, harmonic, 3D/4D grayscale and 3D color modes
• Multi-imaging frequency setting in 2D, Harmonic, color Doppler and Wave Doppler modes

## A4-12L broadband linear array

• Fine pitch, high resolution
• Applications:  vascular, small parts, msk, nerve
• Aperture size: 38.4mm
• Frequency range: 4.0 -12.1MHz
• Pulsed wave Doppler, color Doppler, power Doppler, harmonic
• Multi-imaging frequency setting in 2D, Harmonic, color Doppler and Wave Doppler modes

## A4-9E broadband micro convex endocavity array

• Field of view: 150 degree
• Convex radius: 10mm
• Application: ob/gyn, urology
• Frequency range: 3.3-11MHz
• Pulsed wave Doppler, color Doppler, power Doppler, harmonic
• Multi-imaging frequency setting in 2D, Harmonic, color Doppler and Wave Doppler modes
• Reusable biopsy guide available

**A1-4P phased array**

• Application: cardiac, abdomen,
• Aperture size: 17.92mm
• Field of view: 90 degree
• Frequency range: 1.09-4.18Mhz
• Pulsed wave Doppler, continuous wave Doppler, color Doppler, power Doppler, harmonic
• Multi-imaging frequency setting in 2D, Harmonic, color Doppler and Wave Doppler modes

# Imaging modes

## 2D Imaging

• Pre-defined ATGC (adaptive temporal gain compensation) curves optimized for consistently excellent imaging
• B/M acoustic output: 0-100%
• Depth: able to adjust from 1 to 36cm
• Select between 1 to 8 transmit focal zones
• Reverse function: on/off
• VFusion function
• VSpeckle function
• Harmonic imaging both tissue harmonic and phase inversion
• Cineloop image review
• Selectable 2D line density
• Dual imaging with independent cineloop
• 256(8 bit) gray level
• Up to 8 focus zone adjustable
• Multiple color maps with chroma imaging
• FULL screen imaging to larger image size
• Multi frequency: probe dependent
• Gray filter: 7 steps
• Persistence: 8steps

• Selectable image angles, probe dependent
• Gain: 0-100%
• Dynamic range: 30-280 db
• VSharpen to enhance edge contrast
• Smooth to improve spatial resolution

## Harmonic Imaging

• Supports both tissue harmonic and phase inversion imaging (transducer and frequency dependence)
• Second harmonic processing to reduce artifacts and improve image clarity
• Maximize detail resolution and enhance contrast
• Available on all imaging transducers
• Extends high performance imaging capabilities to all patient body types

## M mode

• Selectable sweeping rates
• Time marks: 0.025 – 0.5 second
• Selectable display format prospective or retrospective (1/3-2/3, 1/2-1/2, 2/3-1/3, side by side 1/2-1/2, side by side 1/3-2/3, full screen)
• Chroma colorization with multiple color maps
• Cineloop review for retrospective analysis of M-mode data
• 256 gray levels

## Color Doppler mode

• Available on all imaging transducers
• Automatically adapts transmit and receive bandwidth processing based on the color box position

- Cineloop review with full playback control
- Steering on linear array transducers
- Selectable in baseline, line density, flash reduction, persistence, maps, frequency, PRF, wall filter, packet size, color level, sensitivity, focus position, acoustic power, and smooth
- Color gain
- Region of interest
- Baseline invert
- Simultaneous mode during PW mode
- Smoothing
- Wall filter
- Zoom

**Power Doppler mode**

- High sensitive mode for small vessel visualization
- Available on all transducers
- Cineloop review
- Multiple color maps
- Individual controls for gain
- Selectable baseline, line density, flash reduction, persistence, maps, frequency, PRF, wall filter, packet size, color level, sensitivity, focus position, acoustic power, and smooth
- Adjustable region of interest

**Pulsed Wave (PW) Doppler**

- Ultra high resolution spectral FFT rate
- Angle correction with automatic velocity scale adjustment
- Normal, invert display around horizontal zero line
- Selectable gray filter, dynamic range, frequency, PRF, wall filter, baseline, angel correct, sample volume
- Selectable sweep speeds: 8 steps
- Maximum velocity range: 12m/s

- PW acoustic output: 0-100%
- Selectable low frequency signal filtering with adjustable wall filter settings
- Selectable grayscale curve for optimal display
- Selectable chroma colorization maps
- Selectable display format prospective or retrospective (1/3-2/3, 1/2-1/2, 2/3-1/3, side by side 1/2-1/2, side by side 1/3-2/3, full screen)
- Auto function to optimize spectral Doppler displ.
- Digitally enhanced stereo output
- 256 gray levels
- Post-processing in frozen mode includes map, baseline, invert and chroma
- Simultaneous or duplex mode of operation
- Simultaneous 2D, color Doppler, pulsed Doppler
- High PRF capability in all modes including duplex and triplex

**Continuous Wave Doppler (CWD)**

- Cardiac sector array transducer only
- Maximum velocity range: 19m/sec

- Available on linear transducers

**Tissue Doppler Imaging (TD) ***

- Present wall motion spectrum by using Doppler principle
- Provide wall motion direction and velocity information
- Available on all sector transducer for cardiac imaging
- Gain

## Advanced Imaging controls

### VFusion

• Available on all transducers and for 2D, 3D/4D
• Up to 5 levels of directional imaging fusion to enrich information
• Operate in conjunction with VSpeckle, harmonic imaging

### VSpeckle

• Available on all transducers and for 2D, 3D/4D
• Virtually eliminate speckle noise artifact and dynamically enhances tissue margins
• Selectable multiple levels of speckle noise reduction and smoothing
• Operates in conjunction with VFusion and harmonic imaging

### VTissue

• Speical imaging processing to adapt to the speed of the ultrasound variation in different tissue
• Improved conspicuity of lesions, such as stone and tendon

### Tview

• Expand view of scanning
• Available on linear transducers

### Pview*

• Real time extended field of view composite imaging
• Ability to back up and realign the image during acquisition

Full zoom, cineloop review and image rotation capabilities
• User can measure distance and area
• Measurement can be made on individual frames during cineloop review

### 3D/4D

• 3D/4D rotation
• Grayscale imaging controls
• Selectable rendering approaches
• Unique high quality rendering algorithm
• Selectable gray maps
• Multi slide cutting
• Cineloop 3D
• Review volume

### Magic Cut*(optional)

• Ability to edit images, make possible to cut away structure obstructing the view in the ROI
• Several cutting methods available

### Free View(optional)

• Provide any plane view to visualize the internal tissue information
• Improve the contrast resolution to facilitate the detection of diffuse lesions in organs

**Inversion mode*(optional)**
 • This render mode is used to display anechoic structures such as vessels
 • It invert the gray values of the rendered image, such as black image information become white and vice versa

**Multi-angle M mode ***
•Sample on moving tissue from multi-angle
• Present wall motion spectrum based on tissue moving

## System Feature

### Display modes

- Simultaneous capability
  - 2D/PW/CW
  - 2D/CF or PDI
  - 2D/M
  - Dual, 2D/2D
  - Dual, 2D/2D+CF or PDI
  - Dual, duplex and triplex
  - Duplex and Triplex mode
  - Quad display in 3D/4D application
  - 9 slice images display in 3D/4D application
- Time line display
  - Independent dual 2D/PW or CW
  - Timed based sweep update mode

### Display annotation

- Institution/hospital name
- Date: 2 types selectable, YY/MM/DD, MM/DD/YY
- Time: 2 types selectable, 24hours and 12 hours
- Operator identification
- Patient name, first, last
- Patient identification: 30 characters
- Gestational age from LMP/EDC/GA/BBT
- VINNO image symbol: Ginkgo leaf
- Power output index
  - MI: mechanical index
  - TIS: thermal index soft tissue
  - TIC: thermal index cranial (Bone)
  - TIB: thermal index bone
- Probe orientation marker: coincide with a probe orientation marking on the probe
- Gray/color bar
- Measurement result window
- Probe type
- Application name
- Image depth
- Imaging parameters by mode
  - 2D/M mode: acoustic power output, gain, frequency, frame rate, dynamic range
  - Color mode: color acoustic power output, color gain, color flow frequency, PRF, wall filter
  - PW/CW mode: Doppler acoustic power output, Doppler gain, Doppler frequency, PRF, wall filter, sample depth
- Focus zone marker
- Body pattern
- PW and CW scale markers: time/speed
- M scale markers: time/depth, time
- System measurement display
- System message display
- Biopsy guide line
- Heart rate

### Cineloop

- Acquisition, storage in memory and display of up to 1500 seconds long of 2D, color and PW/CW images for review

### Compare

- Compare live imaging with stored imaging.

## Quick save feature

• The system provides quick save function through USB stick, internal/external HDD during or after exam
• Configurable saving file format, VRD (VINNO Raw Data), DICOM,JPEG,BMP,PNG and AVI

## Physio

• One 3-lead ECG input*(optional)
• Gain, sweep rate and display position controls
• Automatic heart rate calculation and display
• Fault condition display

## Archive

• Patient data input which include patient ID, name, nationality, birth date, sex, exam physician, quality check, exam operator
• Physical data such as weight, height
• Patient exam management
• Patient exam images storage and management
• Import VRD format data into the system from outside media, such as USB stick, external HDD
• Export patient data into outside medias

## Report

• Automatically pull patient data into the report
• Automatically load measurement worksheet into the report
• Pull related exams' images into the report
• Write comments in the report
• Print report through network or local printer

## Connectivity

• Standard connectivity features
  • Local print to on-board or off-board video printers through USB port
  • Page report print
  • Image export to removable media (external HDD, USB stick)
• Network linkage
  • Image export to network storage servers
  • DICOM export and retrieve *(optional)
• Mobile data transfer solution by
  • Blue tooth*(optional)
  • Email*(optional)
  • Hot point connection
• DICOM workstation for remote diagnostic solution *(optional)
• DICOM,JPEG,BMP,PNG, AVI
  • VRD and DICOM images stored in disc can be recalLCD on the VINNO system
  • JPEG,BMP,PNG and AVI images can be played on
    normal computers
• On-board patient exam storage
  • Direct digital storage of static image or cineloop images to internal hard disk drives
• Fully integrated user interface

## Probes/application

• Selectable multiple applications
• Edit exist application preset
• Edit user defined preset
• Rename preset
• Return to factory preset
• Quick save user defined parameters in related application

## Safety Conformance

• Regulatory Notice:
This device is tested to meet all applicable requirements in relevant. According to 93/42 EEC, it is class IIa medical device.

• Conformity to Standards:

- IEC 60601-1 : 2012  Medical electrical equipment - Part 1: General requirements for basic safety and essential performance
- IEC 60601-1-2:2007  Electromagnetic compatibility - Requirements and tests
- IEC 60601-1-6:2010  Usability
- IEC 60601-2-37:2007  Medical electrical equipment - Particular requirements for the safety of ultrasonic medical diagnostic and monitoring equipment
- IEC 61157:2007  Declaration of acoustic output parameters
- ISO 10993-1:2009  Biological evaluation of medical devices
- IEC 62304:2006  Medical device software –Software life cycle processes
- IEC 62366:2007  Medical devices - Application of usability engineering to medical devices
- Council Directive 93/42/EEC on Medical Device
- WEEE according to 2012/19/EU
- RoHS according to 2011/65/EU

## Measurement and Analysis

### Generic Measurement in 2D mode

- Depth
- Distance
- Perimeter
  - Length and width method
  - Ellipse method
  - Polygon method
  - Spline method
  - Tracing method
- Area
  - Length and width method
  - Ellipse method
  - Polygon method
  - Spline method
  - Tracing method
- Volume
  - Single line method
  - Dual line method
  - Triple line method
  - Single ellipse method
  - Single ellipse and single line method
- Angle
- Stenosis
  - Diameter method
  - Square meter method
- A and B ratio
  - Diameter ratio
  - Square meter ratio

### Generic Measurement in CFM mode

- CFV
  - point
  - profile

## Generic Measurement in M mode

- Depth
- Distance
- Time
- Slope
- Heart rate
- Stenosis
- A and B ratio
  - Diameter ratio
  - Time ratio
  - Velocity ratio

## Generic Measurement in PW mode

- Speed (include PV (Peak Velocity))
- Time (include AT (Accelerate Time))
- Acceleration
- PS (Peak Speed in systole period)
- ED (The speed in the end of diastole period)
- MD (Minimum speed in diastole period)
- TAMAX (maximum speed in time average)
- TAMEAN (mean speed in time average)
- TAMIN (minmum speed in time average)
- PI (Pulsatility Index)
- RI (Resistance Index)
- PS and ED ratio
- ED and PS ratio
- A and B ratio (A/B ratio)
  - Speed ratio
  - Time ratio
  - Acceleration ratio
- FLOWVOL (Flow Volume)
- MaxPG ( maximum pressure gradient)
- MeanPG (Mean pressure gradient)
- SV ( Stroke Volume)
  - Each volume diameter cardiac

- Time mean speed in each stroke volume
  - Cardiac output
- Heart rate

## Abdominal Measurement

- General abdomen
- Difficult abdomen
- Kidney
- Renal vessel
- Abdominal trauma

## Small Part Measurement

- Thyroid
- Breast
- Testis
- Musculoskeletal
- Upper and lower extremity joint
- Nerve block

## Vessel Measurement

- Carotid artery
- Upper artery
- Upper vein
- Lower artery
- Lower vein
- Vessel puncture
- Transcranial Doppler

## Gynecology Measurement

- Uterus and Pelvis
- Follicle

## Urology Measurement

- Bladder
- Prostate
- Renal
- Kidney and ureter
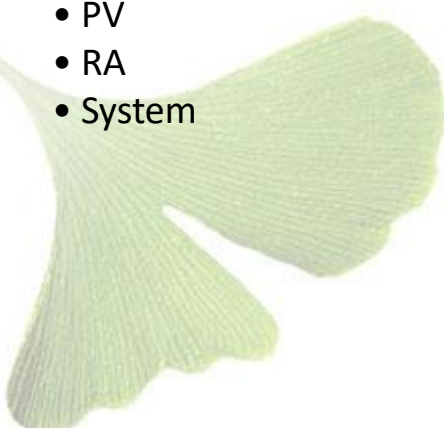- Pelvic Floor dysfunction

## Pediatric Measurement

- Neonatal Head
- Neonatal Abdomen
- Pediatric Abdomen
- Pediatric Hip
- FAST

## Obstetrics Measurement

- OB Early
- OB Mid
- OB Late
- Fetal Heart

## Cardiac Measurement

- General
- LV
- MV
- Ao
- AV
- LA
- RV
- TV
- PV
- RA
- System

## Auto Follicle(2D)(optional) *

- Just click on the area of follicle in B mode, the area of this follicle will be reported automatically
- Report the area of different follicle in the volume data automatically

## Auto NT (Nuchal Translucency ) measurement*

- Automatically detect Nuchal Translucency in interest box
- Automatically report thickness result  of NT

## Auto IMT (Intima-Media Thickness) measurement*

- Automatically detect intima media thickness in interest box
- Automatically report the result of IMT
- Available in linear probe

## Smart 3D Calculation

Displays sequential slices of 3D anatomy to facilitate more precise volume analysis of irregularly-shaped structure