

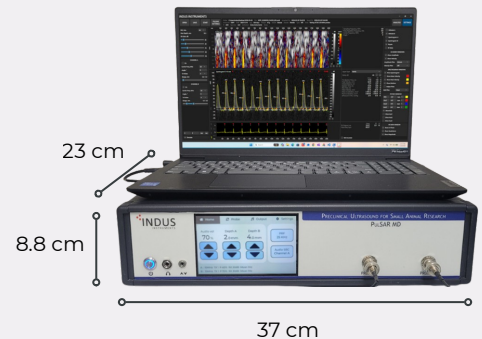
PuSAR MD System

Technical Specifications

OVERVIEW

The Indus Instruments PuSAR MD (M-mode Doppler) System is a high-frequency, real-time M-Mode and pulsed Doppler measurement device with integrated auto analysis software designed specifically for measuring cardiovascular function in small animals.

The system consists of the following components: Integrated Electronics - Pulsed Doppler Transceiver (PDT: 10, 20, & 30 MHz switchable dual channel system), Doppler Signal Digitizer (DSD), and Physio Signal Digitizer (PSD)), M-mode/Doppler Workstation (MDW) with Auto Analysis Software.



Integrated Electronics: (PDT, DSD, & PSD)



PuSAR MD System

Includes M-Mode /Doppler Workstation w/mouse (MDW; top), Integrated Electronics (PDT+DSD+PSD; bottom), and with Probes attached.



Integrated Electronics front panel has Doppler probe inputs and LCD touch panel for signal adjustment controls. It also has power button, audio connector, and depth control connector.



Integrated Electronics back panel has Doppler channel A and channel B outputs and Physio inputs, USB-C cable, ground connector, and the power adapter (+24V/3A DC) connector.



Tubing-mounted probe (10, 20, or 30 MHz) for noninvasive measurements.

Doppler Channels	2 (A&B), each switchable between 10, 20, & 30 MHz			Variable Range Gate	1-10 mm (1-13 μ s)		
Power	110 VAC / 60Hz or 220 VAC / 50Hz			Velocity Outputs	0.25 V/kHz simultaneous Phasic & Mean		
Recorder Outputs	Ch A: I, Q, Mean & RF; Ch B: I, Q, Mean & PRF			Velocity Output Filters	Phasic (50 Hz), Damped (15 Hz) & Mean (0.25 Hz)		
Recorder Inputs	4 Physio inputs: EKG, Aux1, Aux2, & Aux 3			Probe Connection	BNC Connector		
Audio Outputs	Speakers and connector for headphones			Front Panel	Power Button, LCD Touch Panel, Audio, Depth, and BNC Doppler Probe Connectors		
External Ground	Intended for chassis grounding, if required			Back Panel	Channel A Outputs – RF, Mean Velocity, Doppler I & Q Channel B Outputs – PRF, Mean Velocity, Doppler I & Q Physio Inputs – ECG, Aux1, Aux 2, Aux 3		
USB	USB3 for PuSAR & Computer bidirectional communication			Back Panel other	USB3-C, Ground connector, Power Adapter Plug		
Ultrasound Frequency	10 MHz	20 MHz	30 MHz	Maximum Velocity Range	at 10 MHz	at 20 MHz	at 30 MHz
Pulse Repetition Frequency	25, 50, 100 kHz	25, 50, 100 kHz	25, 50 kHz	at 100kHz PRF, 0° angle	770cm/s	385cm/s	257cm/s
Transmitter Output	25 Vpp into 50 Ohm / 35 Vpp into 50 Ohm			at 50kHz PRF, 0° angle	385cm/s	193cm/s	128cm/s
Input Voltage Range	± 10 V			at 25kHz PRF, 0° angle	193cm/s	96cm/s	64cm/s

Doppler Flow Velocity Measurements

Systolic Indices: Aortic Outflow

Peak Velocity
Mean Velocity
Peak Acceleration
Mean Acceleration
Pre-Ejection Time
Ejection and Rise Time
Stroke Distance

Systolic Indices: Aortic Outflow

R-R Interval
Heart Rate

Diastolic Indices: Mitral Inflow

E-Peak and E-Stroke Velocity
E-Time Duration
E-acceleration & E-deceleration time
E-Peak to ½ E-Peak Time
E-Linear Deceleration Time and Rate
A-Peak
Stroke Distance
A-Time Duration
E-A Peak Velocity Ratio
Isovolumic Contraction Time
Isovolumic Relaxation Time

Peripheral Artery Indices: Carotid, Renal, Femoral, Ophthalmic, Tail

Peak Velocity
Mean and Minimum Flow Velocity
Pulsatility Index
Resistivity Index

Other Indices: Coronary, Transverse, and Abdominal Aorta

Peak Diastolic Velocity (Coronary)
Peak Systolic Velocity (Coronary)
Diastolic & Systolic Area (Coronary)
Ratios PSV/PDV & SA/DA
Pulse Wave Velocity

Mode Measurements

Primary Indices: Measured - Left Ventricle

LVIDs & LVIDd Short-axis
LVAWs & LVAWd Short-axis
LVPWs & LVPWd Short-axis
LVESD & LVEDD Short-axis
LVIDs & LVIDd Long-axis
IVSs & IVSd Long-axis
LVPWs & LVPWd Long-axis

Secondary Indices: Left Ventricle - Calculated

Ejection Fraction
Fractional Shortening
End Diastolic Volume
End Systolic Volume
Stroke Volume
Cardiac Output
Posterior Wall Thickness
Relative Wall Thickness during diastole and systole
Left Ventricular Mass
Left Ventricular Mass Index

Artery Indices:

Vessel Diameter

