



Keys to

Using Transonic Systems' PAX & A Series Flowprobes

Transonic Systems' PAX & A Series perivascular flowprobes were designed to measure cardiac output on the great vessels with a higher level of accuracy. Turbulent flow profiles in the ascending aorta and pulmonary artery necessitated a probe with uniform sensitivity. The lightweight, narrow probe body provides low impact instrumentation for vessel sites with non-uniform flow profiles or limited anatomical access.



Ascending Aorta Pulmonary A Portal Vein

Choice of Size

8 mm, 10 mm, 12 mm, 14 mm, 16 mm, 20 mm, 24 mm, 28 mm, 32 mm, 36 mm.

An exact fit on the vessel is not required, but the vessel should fill at least 80% of the probe opening. Probes implanted for measurements at a later date should fit loosely and not constrict the vessel.

Acute Application

Vessel preparation for use of Transonic PAX & A Series probes is typical. Dissect around the vessel for placement of the probe. Be sure to clean the vessel of fat which can alter the signal and have an affect on accuracy. You may fill the probe cavities with acoustic gel (Surgilube or HR jelly) before placing the probe on the vessel or use a syringe with a catheter tip to deposit gel and. Trapped air bubbles can affect accuracy

Replace the clip by sliding or snapping into place. Adjust probe placement so that it rides perpendicular to the vessel and is not twisted, misaligned or rocking on the vessel.

Verify adequate signal in Test Mode on the flowmeter. The probe size will be displayed and signal amplitude should read about 1 Volt.

Chronic Implant

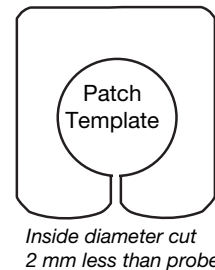
The PAX & A Series probes are now also preferred for long term implantation because of their lightweight construction and clean signals. Successful implants of 1 year or more are reported. Modifications to the probes and to protocol should be followed to ensure healthy probe seating on the vessel and stabilization by fibrotic encapsulation. Encircling a high pressure vessel like the ascending aorta with a flowprobe warrants special treatment. Careful attention must be made to dissect the vessel. Small surgical injuries can become catastrophic events during recovery.

Vessel Padding

Although there are surgeons who are successful using no interface between the vessel and probe, we do recommend padding the flowprobe edge to protect the vessel from irritation and possible erosion. This extra step during surgery is a minor inconvenience compared with the loss of a chronically instrumented animal. Various materials and techniques are available for this (see table below).

Wrap: The most common method is to wrap the vessel with the material before placement of the probe. Since the material is within the acoustic beam of the probe, it can have an affect on the signal. Higher frequency probes are attenuated more by this treatment.

Patch: Polyester felt patches attached to the outside surface of the probe do not interfere with the acoustic signal. In this alternative approach, patches are cut to fit the outside flat surface of the probe with the circle for the vessel cut slightly smaller than the diameter of the probe. These are attached to the outside of both flat surfaces of the probe with silicone cement and slit at the opening to allow placement on the vessel. Fibrous tissue adheres to the outside of the probe and seats the vessel well without interfering with the acoustic signal.



Clip Fixation: The PAX & A Series probe closure "clip" can be snapped or slid into place, and should be seated firmly in the probe. Bone wax (medical grade orthopedic wax) applied to the groove of the probe helps fix the clip in place. If after several uses, the clip becomes loose from wear, it is now possible to order additional clips without returning the probe.

Chronic Connectors: Small connectors are preferred for subcutaneous tunneling. Available connectors for:

PAX-Series for 400-Series Flowmeters
CRS10 (sealed connector with cap)
CRB10 (plastic skin button)

A-Series for T106/T206
CM4B (sealed mini connector)
CB4 (titanium skin button),
CS10 (sealed)
CB10 (plastic skin button)



Tel: 800-353-3569(USA); Fax 607- 257-7256; www.transonic.com
Europe: Tel: 31 43 407 7200; e-mail: info@transonic.nl; Fax: 3143 407 7201
Japan: Tel: 492 26 0557; e-mail: miba@wa2.so-net.ne.jp; Fax: 492 23 0028



Keys to

Using Transonic Systems' PAX & A Series Flowprobes

Validated In Vivo

Dean, D.A., Cabreriza, S.E., Jia, C-X, D'Alessandro, D.A., Sardo, M.J., Chalik, N., Soto, P.F., Dickstein, M.L., Spotnitz, H.M., "Validation Study of a New Transit-Time Ultrasonic Flow Probe for Continuous Measurements on the Great Vessels," ASAIO Journal Abstracts, Vol. 42, No. 2, p. 26, 1996. (pig, ascending aorta, CO probe, right heart bypass model, calibrated roller pump) (29V)

Remond, D., Ostigues, M.I., Isserty, A., Lefaivere, J., "Technical Note: Measuring Portal Blood Flow in Sheep Using An Ultrasonic Transit Time Flow Probe," Journal of Animal Science, Vol. 76, No. 10, p. 2712-1216, 1998. (sheep, portal vein) (39V)

Calibration

Transonic PAX-Series flowprobes were validated in vivo in acute application in rigorous protocols and tested extensively during design to achieve probes that would accurately measure flow under the most challenging conditions. These conditions include acoustical variations of coupling agents, misalignment and highly pulsatile, perturbed flow.

Acute/Chronic

Transonic Systems calibrates all PAX & A-Series flowprobes to standards for acute application regardless of the intended use. This is an exception to the calibration standards of other Transonic perivascular flowprobes. We offer two calibration values for R and S-series flowprobes: probes that will be chronically implanted are calibrated 10% lower than acute use probes (see Technical note # 11). This difference in calibration compensates for the decreased sensitivity of Transonic R & S- Series probes when the vessel is not centered in the flowprobe and when using acoustic gel (versus implanted probes coupled by fibrotic tissue). By design, Transonic PAX & A Series flowprobes exhibit uniform sensitivity and are affected less by acoustical variation of coupling agent.

Transonic Systems stands behind the validated calibration of the PAX & A Series probes and does not recommend applying a correction factor for chronic use without data to support a calibration change. Several customers have proposed such studies to validate the flowprobes in chronic application.

	PRODUCT	DESCRIPTION	PROBE RECOMMENDATIONS	EFFECTS ON PROBE PERFORMANCE	PRODUCT SOURCE
VESSEL PADDING	ULTRACELL	Soft, biodegradable, surgical wipe	all sizes	Attenuates signal at implant air absorbed longterm 20A: 10% signal loss 10A: 15% signal loss	Transonic Catalog # APSPONGE
	MERSILENE MESH	Soft, interlocked, polyester fiber; Nonabsorbable	all sizes	Attenuates signal: 20A: 4% signal loss no offset change 10A: 25% signal loss offset noisy	Transonic Catalog # APMERSILENE
	PROLENE MESH	Soft, polypropylene mesh; Nonabsorbable	Do not use for 8, 10, 12 mm probes	Attenuates signal: 20A: 30% signal loss no offset change 10A: 82% signal loss offset noisy	Transonic Catalog # APPROLENE Ethicon PMH
PROBE PATCH	POLYESTER FELT (Medical Grade)	Soft felt, Nonabsorbable	all sizes	Apply to outside of probe; No affect on signal	Sold by Impra C.R. Bard #008972
CLIP FIXATION	BONE WAX	Medical grade wax for orthopedic surgery	all sizes	none	Ethicon W-31
	PROBE CLIPS	closure piece	size dependent	keeps vessel within probe	Transonic Catalog # FAC (probe size) A