Precision Perivascular Flowprobes

For Use With TS420 Flowmeter Modules

- Absolute volume flow data from mice to large animals
- Acute use and implantable Flowprobes for arteries, veins and ducts
- Multiple configurations to meet experimental needs of many animal models
- Unparalleled accuracy & signature high resolution flow waveforms

PS-SERIES INCLUDING NANOPROBES

0.5-1.5 mm Nanoprobes are scaled to fit mouse anatomy for acute or chronic use.

2-20 mm Flowprobes offer the greatest diversity of customizable features for the perfect fit in any application.

PS- Nanoprobes

PS-Series

PR-SERIES

1 & 1.5 mm Flowprobes for small acute or chronic applications where a more robust design than the Nanoprobes is needed.

PR-Series

PAU-SERIES

8-36 mm COnfidence Flowprobes® with Ultrafit Liners for ascending aorta and pulmonary artery cardiac output studies.

PAU-Series

V-SERIES

0.5 & 0.7 mm Microcirculation Flowprobes for acute use only. Larger body and more robust than Nanoprobes. Requires more acoustic gel for larger lumen.

V-Series

transonic
THE MEASURE OF BETTER RESULTS.

Ordering PS-, PR-, PAU-, & V-Series Flowprobes

Standard Acute Use Flowprobes

All MA- Flowprobes come with the standard maximum cable length, CRA10 connector, and acute calibration (acute/chronic calibration for PAU-Series)

Catalog #: MA - ____ ____ *

Size Series Cable Orientation

Examples:

MA-2PSS (Acute use 2 mm PS-Series Probe with side cable exit)

MA-0.5PSB (Acute use 0.5 mm PS-Series Nanoprobe with back cable exit)

MA-20PAU (Acute use 20 mm PAU-Series Probe)

* Cable orientation available for PS- & PR-Series only

Custom Configured Flowprobes

Custom configured Probes are available for most Probe series to meet individual application and implant needs. Contact Customer Service for species/vessel recommendations or configure Probes from the table codes. Please note intended application for confirmation when ordering custom Probes as this will assist with determining the most ideal configuration. Custom Probes cannot be exchanged.

Catalog #: MC - ____ ____ * ____ - * ____ - ____ - ____ - ____

Size Series Cable Orient. Reflector Cable Length Connector Calibration

Application: _____

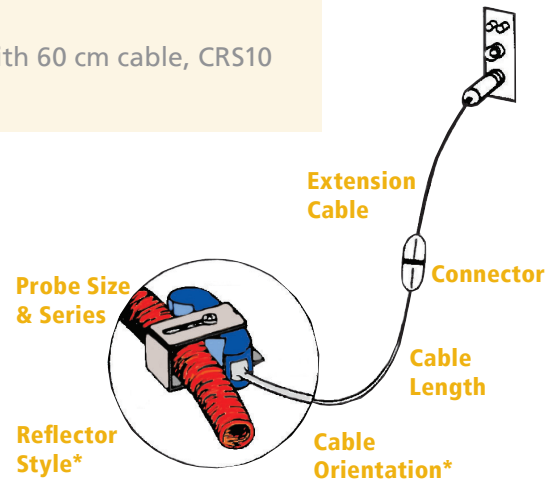
Species, Vessel

Examples:

MC-1.5PSL-JN-WC04-CA4S-GC (Custom 1.5 mm PS-Series Probe with lateral cable, J reflector, 4 cm cable, CA4S connector and chronic calibration)

MC-20PAU-WC60-CRS10-GAC (Custom 20 mm PAU-Series Probe with 60 cm cable, CRS10 connector and acute/chronic calibration)

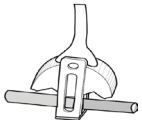
* Cable orientation and reflector style available for PS- & PR-Series only



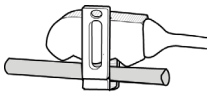
Custom Ordering of Perivascular Flowprobes

CABLE ORIENTATION*			
CODE	ORIENTATION	PS-SERIES	PR-SERIES
B	Back	0.5 - 20	1 - 1.5
S	Side	0.5 - 20	1 - 1.5
L	Lateral	0.5, 1.5 - 2.5	N/A

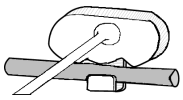
*Determined by anatomy and surgical approach.



B- Back: perpendicular to vessel



S- Side: parallel to vessel



L- Lateral: for thoracotomy

REFLECTOR STYLES FOR SPECIAL APPLICATIONS				MA- STANDARD
CODE	DESCRIPTION	PS-SERIES	PR-SERIES	
LS	L w/ slide cover	3 - 20	N/A	3-20PS
LSF	L w/ slide & silicone flange	3, 4, 6	N/A	
JN	J w/o slide	0.5 - 16	1 - 1.5	1.5PSL
JFH	J w/o slide w/ flexi-handle	0.5 - 2.5	1 - 1.5	0.5, 0.7PS
JS	J w/ slide cover	2 - 16	1 - 1.5	2-2.5PS, 1-1.5PR
JSF	J w/ slide & silicone flange	2, 2.5	N/A	
U	U reflector	3 - 20	N/A	
USW	U w/ wide silicone shield	6 - 20	N/A	
USN	U w/ narrow silicone shield	6 - 20	N/A	

L reflector with slide

J reflector with slide

U reflector

STANDARD MAX CABLE LENGTH				
CODE	DESCRIPTION	PS-SERIES	PR-SERIES	PAU-SERIES
WCxx	Up to 60 cm	Nanoprobes	1 - 1.5	
WCxxx	Up to 100 cm	2 - 20*	N/A	
WCxxx	Up to 200 cm	N/A	N/A	8-36*

*Substitute xx for shorter lengths

CONNECTORS					SERIES	
CODE	DESCRIPTION	ACUTE/CHRONIC	ANIMALS	ID KEY REQUIRED	PS- / PR-	PAU-
CRA10	10-pin Redel acute connector	Acute	All	No	all sizes	
CRS10	10-pin Redel sealed connector w/ cap	Chronic	Dog & larger	No	all sizes	
CS12	12-pin titanium connector w/ cap	Chronic	Dog & larger	No	1 - 20	all sizes
CB12	12-pin titanium skin button w/ cap	Chronic	Dog & larger	No	1 - 20	all sizes
CM4B	4-pin mini connector w/ cap & straight cable	Chronic	Rat, Rabbit & larger	Yes	all sizes	N/A
CM4S	4-pin mini connector w/ cap & right angle cable	Chronic	Rat & Rabbit	Yes	all sizes	N/A
CA4B	4-pin micro connector w/ straight cable	Chronic	Rat & Mouse	Yes	0.5 - 10	N/A
CA4S	4-pin micro connector w/ right angle cable	Chronic	Rat & Mouse	Yes	0.5 - 10	N/A

CALIBRATION		SERIES		
CODE	DESCRIPTION	PS- / PR-	PMP- / V-	PAU-
GA	Acute calibration	all sizes		
GC	Chronic calibration	all sizes	N/A	
GAC	Acute/Chronic calibration	N/A	N/A	all sizes
GX	Custom calibration	all sizes	N/A	

SILICONE FLANGE (SF) FOR CORONARY IMPLANTS

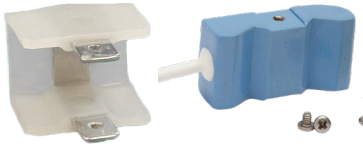
Mesh-reinforced silicone flange cemented around the perimeter of Probe is sutured to the myocardium to stabilize the Probe on the heart in LAD artery application; also used in umbilical artery (fetal sheep) application. Can also be used to hold coupling gel in place during acute experiments and to keep the Probe aligned on the beating heart.

Probe with Silicone Flange (SF)

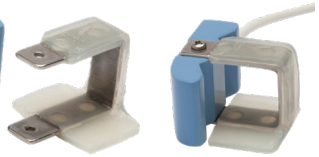
SILICONE SHIELDS (USW & USN)

U-reflectors on PS-Series Probes may be silicone encapsulated for chronic implant. Cushions vessel for ascending aorta and pulmonary artery implant. Stabilizes Probe on collapsible vessels (i.e. portal vein); keeps fat from infiltrating Probe.

Wide Silicone Shield (USW)



Narrow Silicone Shield (USN)



Connectors & Accessories for Flowprobes

CRA10 ACUTE REDEL

MA- Standard for Acute Use Probes: Plugs directly into Flowmeter or extension cable.

CRS10 SEALED REDEL

Implantable plastic connector has conical threaded cap with suture hole for easy subcutaneous tunneling. Cap contains sealing gasket. Plugs directly into Flowmeter or extension cable.

CS12 SEALED TITANIUM

Sealed Titanium Connector with pointed cap. Connector includes the Flowprobe calibration EPROM.

CB12 TITANIUM SKIN BUTTON

For long term implantation with any style Probe. The Probe ID EPROM is integrated in the connector. The connector comes with a flat Delrin cap. A pointed cap (CB12-PC) can also be ordered separately. Use with 12-pin extension cables. For dogs, pigs and other large animals.

CONNECTOR DIMENSIONS IN MM				
CODE	HEIGHT	CAP DIAMETER	SHANK DIAMETER	FLANGE DIAMETER
CRA10	44.5	N/A	14	N/A
CRS10	40.3	15.3	11.1	N/A
CS12	32	11.5	9.4	N/A
CB12	21.5	11.5	9.4	18.3
CM4B	15	8	8	N/A
CM4S	15	8	8	N/A
CA4B	10	N/A	4.1	N/A
CA4S	10	N/A	4.1	N/A

PROBE ID KEY FOR 4-PIN CONNECTORS

Flowprobes configured with 4-pin connectors require Probe ID Keys. Probe scale, signal normalization and calibration gain are programmed into the serialized EPROM key. Keys plug into the port of the TS420 Module during Probe use.

CM4B (STRAIGHT) & CM4S (RIGHT ANGLE) 4-PIN

Implantable plastic mini connectors come with a threaded cap with suture hole, sealing gasket, and Probe ID key. Use with 4-pin extension cables. CM4B has a straight cable entry to ease tunneling subcutaneously and can be stored in an animal jacket pocket when not in use. The CM4S connector has a right angle cable entry and is used with silicone or rigid cuffs to stabilize connector in mid-scapular region. Can be used for most species including: rats, rabbits, and dogs.

CA4B (STRAIGHT) & CA4S (RIGHT ANGLE) 4-PIN

Minimal impact micro connectors, the 4-pins terminate the Probe cable with a bare minimum of housing. Use with 4-pin extension cables. Comes with Probe ID key. CA4B (straight cable entry) can be threaded into spring stock for use with electrical swivels. CA4S connectors have a right angle cable entry and can be stabilized in the mid-scapular region with a rigid or silicone cuff. For rats and mice.

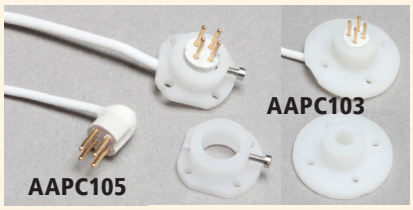
CALIBRATION INFORMATION

Transonic® Precision Perivascular Flowprobes are each precalibrated for absolute blood flow measurement at 37°C using a gravity-fed constant flow setup with water (see RL-5-tn). We calibrate Probes for their intended use to compensate for the different acoustic conditions when using an acoustic gel in acute applications versus fibrotic tissue infiltration that stabilizes the Probe in a chronic implant. Probes calibrated for acute use are calibrated to read 10% higher than Probes for chronic implant (Except PAU-Series with acute/chronic calibration). Sub-acute applications (1–2 days) more closely mimic an acute preparation and should be calibrated for such. Acute calibration is also recommended for Probes that are used for both acute and chronic application since acute measurements are more often interpreted in absolute terms rather than relative changes in flow over time. Custom calibration for atypical use is available (ex: for fish at 10°C).

Connectors & Accessories for Flowprobes

Cuffs for Chronic Probe Implants

Soft silicone cuffs aid stabilizing mini (CA4 & CM4) connectors for short term implant. Suture holes in base of flange allow attachment on top of skin. Supplied in packages of 10.



Delrin rigid cuffs convert mini connectors to skin buttons for small animal use. Suture holes allow attachment on top of skin; set screw holds connector in place. Robust for long-term or multiple use.

CODE	DESCRIPTION	COMPATIBLE CONNECTOR	HEIGHT (MM)	DIAMETER (MM)
AAPC102	Silicone cuff	CM4S	18.9	5.4
AAPC103	Silicone cuff	CA4S	15	5.4
AAPC104	Rigid cuff	CM4S	19	7.1
AAPC105	Rigid cuff	CA4S	9	3.7

ACOUSTIC COUPLANT FOR ACUTE APPLICATIONS

Acoustic couplant gel is used to displace the air between the Flowprobe and the vessel during acute application because air will block transmission of the ultrasound signal. Appropriate coupling gels for use with Transonic® Flowprobes have acoustic properties at various temperatures that closely match blood. See RL-9-tn for complete listing.

- Surgilube: (# ZC510 4.25 oz. tube) Bacteriostatic Surgical Lubricant from E. Fougera & Co.
- NALCO 1181 (# APNALCO 6 oz.) Superabsorbant powder to thicken Surgilube gel for long experiments. For terminal use only.

PROBE & CONNECTOR STABILIZATION PRODUCTS

MERSILENE MESH (APMERSILENE): 6 x 6" square soft interlocked polyester fiber mesh implanted under connector fortifies thin skin for cuff or button sutures.

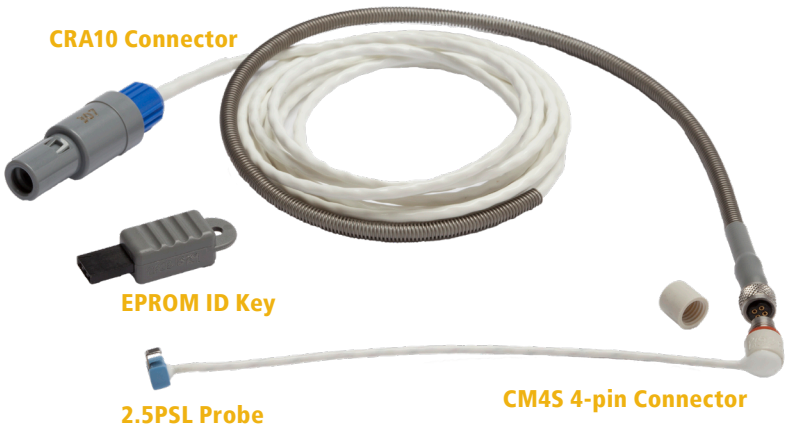
SILICONE WRAPPING STRIP (APWRAP): Thin silicone strip reinforced with mesh wraps around outside of a Probe to stabilize the Probe on a vessel. Provides additional suture points and keeps fat from infiltrating the Probe over long implants.

Silicone Wrap sutured around Flowprobe

PROLENE MESH (APPROLENE) & ULTRACELL SPONGE (ASPONGE): Used in chronic implant to protect the ascending aorta against long-term erosion. For use with Probes without full liners (PAX & 32, 36PAU).

EXTENSION CABLES		
CATALOG #	TYPE	DESCRIPTION
CRA10-S-CRA10	10-pin	1.25 meter
CRA10-M2-CRA10	10-pin	2 meter (not for use with nanoprobes)
CRA10-M3-CRA10	10-pin	3 meter (not for use with nanoprobes)
CRA10-X-CRA10	10-pin	Custom length for MRI
CM12-S-CRA10	12-pin	1.8 meter
CM12-X-CRA10	12-pin	Custom length
CM4-S-CRA10	4-pin	1.8 meter with spring
CM4-M3-CRA10	4-pin	3 meter (not for use with nanoprobes)
CM4-X-CRA10	4-pin	Custom length; no spring
CA4-S-CRA10	4-pin	1.8 meter; mouse cable; no spring

Nanoprobes require 185 cm total cable length (probe + extension cable) to meet specification.



CLEANING & STERILIZATION

Follow the directions included with each Flowprobe (I1041).

CUSTOMER SERVICE

Contact your local distributor or sales representative for quotations, shipping information and payment terms. Please feel free to contact us if you have questions or visit our website www.transonic.com for the most up-to-date product offerings, applications and technical support, and reference materials.

LIMITED WARRANTY

Transonic Systems Inc.® warrants that perivascular Flowprobes are free from defects which are the result of faulty material or workmanship by Transonic Systems Inc.® for a period of six (6) months (Nanoprobes: 3 months) from their date of shipment. The warranty of Transonic® shall not apply to: defects caused by abuse, neglect or misuse; damage due to accident or casualty; or un-authorized alterations or repairs made by anyone other than Transonic Systems Inc.®

Transonic Systems Inc.® will, at no charge to the user, either repair or replace a defective Flowprobe during its warranty period. The Buyer pays shipping charges to Transonic Systems Inc.® Transonic® will pay for the return shipping charges. No other warranty oral or written, expressed or implied. Transonic® is not liable for incidental or consequential damages. Warranty is valid only if equipment is purchased through Transonic® or a duly appointed distributor or licensed representative.

CALIBRATION CERTIFICATION & REPAIR SERVICE

Transonic® Flowprobes are precalibrated at the factory with equipment that has been calibrated traceable to the standards of National Institute of Standards and Technology and to Transonic Systems Inc.® equipment performance standards. At purchase, Flowprobes are issued a Certificate of Calibration valid for one year. Probes may be returned to Transonic® for recalibration if Calibration Certification is required for GLP studies.

Transonic® will also perform repairs on Flowprobes which have been damaged or cut. Contact Transonic® or your local distributor for an RMA # (Return Materials Authorization).

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Transonic Systems Inc. is a global manufacturer of innovative biomedical flow measurement equipment. Founded in 1983, Transonic sells state-of-the-art, transit-time ultrasound devices for surgical, hemodialysis, perfusion, ECMO, and medical device testing applications, and for incorporation into leading edge medical devices.

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