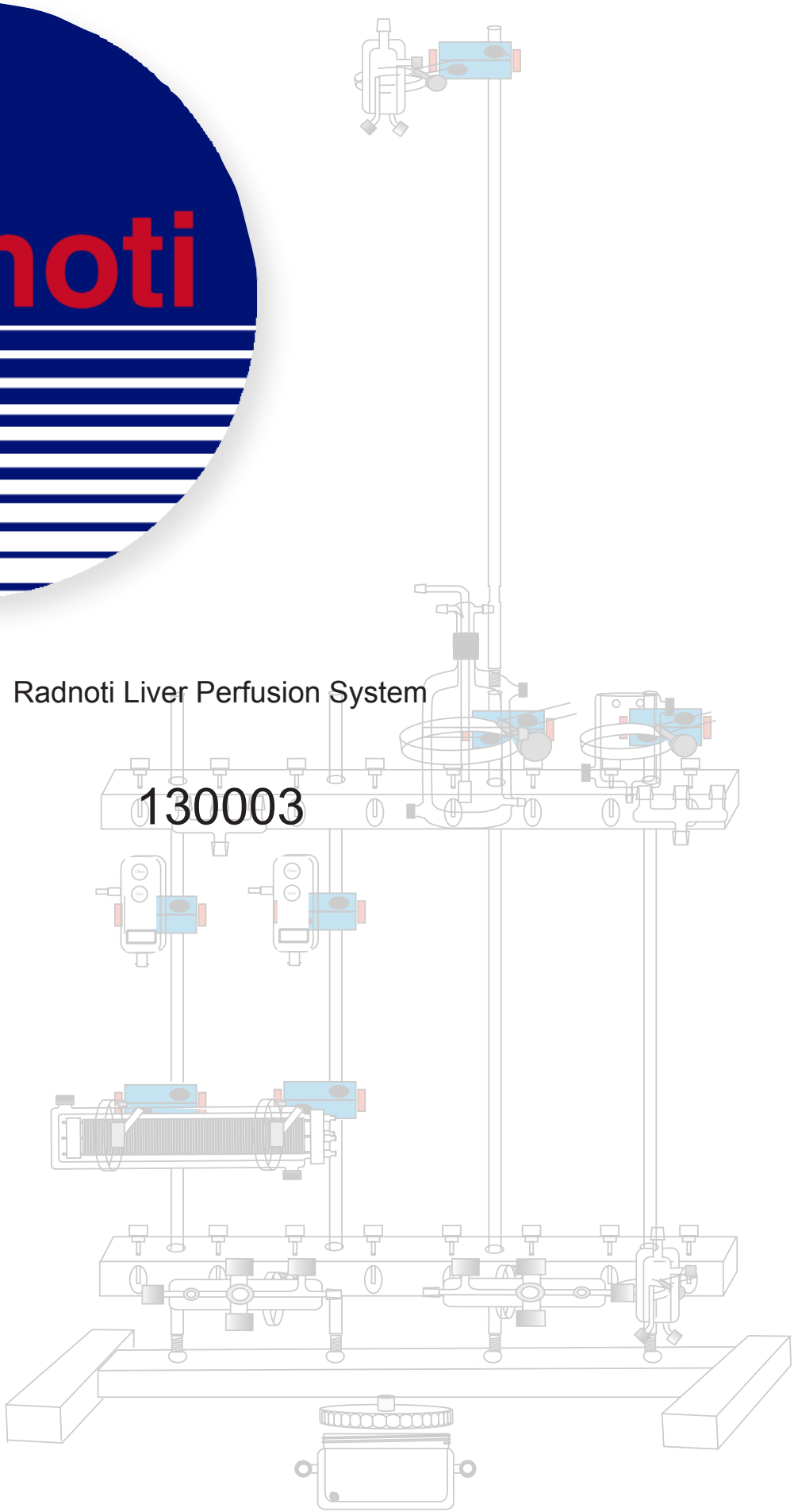
Radnoti



Radnoti Liver Perfusion System

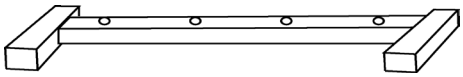
130003

®Radnoti 2006

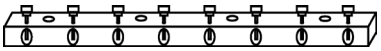
	Description	Qty	Part #
A	Base only, for 4-bar stand	1	159950-B4
B	Stabilizer Bar only, for 4-Bar stand	2	159950-C4
C	Rod 24” Long Stainless Steel	5	159950-24
D	Single Ring Clamp (Membrane oxygenator)	2	130144-RC
E	Single Ring Clamp (in/out flow manifold ele+sep)	2	159953-2
F	Single Ring Clamp (Bubble trap)	2	120149-RC
G	Single Ring Clamp (Liver perfusion reservoir w/j 100ml)	1	159953-100
H	Single Ring Clamp (500ml reservoir)	1	120141-0
I	Stand Clamp Medium (Red)	7	159952-11
J	Water-Jacketed Reservoir 500ml	1	120142-0
K	Oxygenating Bubbler with 2 inlets	1	140144-0
L	Liver Perfusion Chamber w/opt port and lid	1	670101
M	Liver Perfusion Reservoir w/j 100ml	1	1581-100
N	Bubble Trap Compliance Q.D.	2	130149
O	Inflow Manifold Triple Elect+Septa	1	120170-3
P	Outflow Manifold Triple Elect+Septa	1	120171-3
Q	Membrane Oxygenator (Small)	1	130144-MH
R	Luer Manifold 4-Port	2	120165-4
S	Heater Bath Circulator Pump	1	170051-A
T	Peristaltic Pump	1	170100-A
U	Easy Load Pump Head	2	170110
V	Pressure Transducer	2	159905
W	Water-Jacketed Flex Tube Assembly		
	36”	2	130155-36
	48”	1	130155-48
	60”	1	130155-60
X	Q.D. Tygon Tubing (Water-Jacketed)		
	10”	3	120159-10
	15”	5	120159-15
	20”	7	120159-20
	30”	1	120159-30
	48”	1	120159-48
Y	Inner Tygon Tubing (Perfusate, gas)		
	10”	3	120157-10
	20”	4	120157-20
	24”	1	120157-24
	40”	2	120157-40
	48”	2	120157-48
AA	Manifold 5 Port Q.D.	2	120161
BB	Silicone Tubing		
	20”	2	130144-188-20
	24”	1	130144-188-24
	40”	1	130144-188-40

Radnoti

(A)
4-Bar Stand

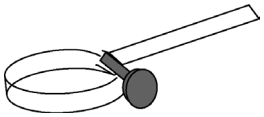


(B)
Stabilizer

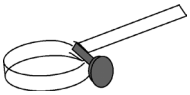


(C)
S.S. Support Rod

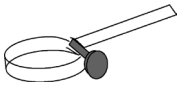
(D)
Single Ring Clamp



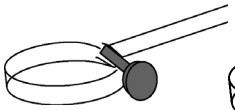
(E)
Single Ring Clamp



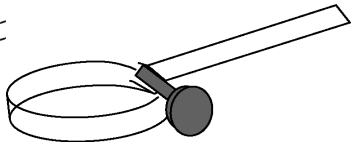
(F)
Single Ring Clamp



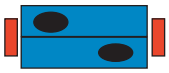
(G)
Single Ring Clamp



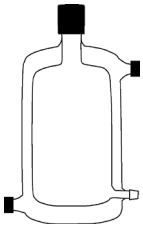
(H)
Single Ring Clamp



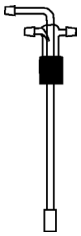
(I)
Stand Clamp



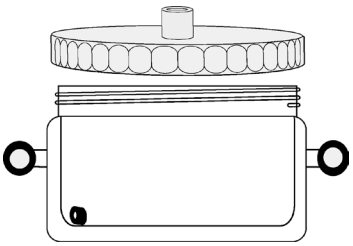
(J)
Water-Jacketed
Reservoir



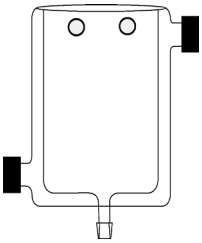
(K)
Oxygenating
Bubbler



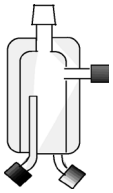
(L)
Liver Perf Chamber



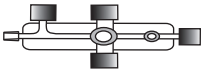
(M)
Liver Perf Reservoir



(N)
Bubble Trap (comp) Q.D

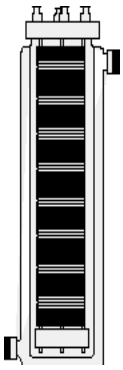


(O,P)
Inflow and Inflow
Manifold

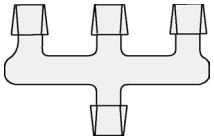


(S)
Heater Bath
Circulator Pump

(Q)
Membrane Oxygenating

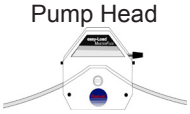


(R)
4-Port Luer Manifold

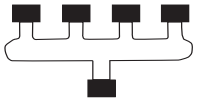


(T)
Peristaltic Pump

(U)
Easy-Load
Pump Head



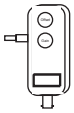
(AA)
Manifold 5 port QD



(W)
Flex Tube Assembly

(X)
Q.D. Tygon Tubing

(V)
Pressure Transducer



(Y)
Inner Tygon Tubing

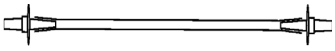
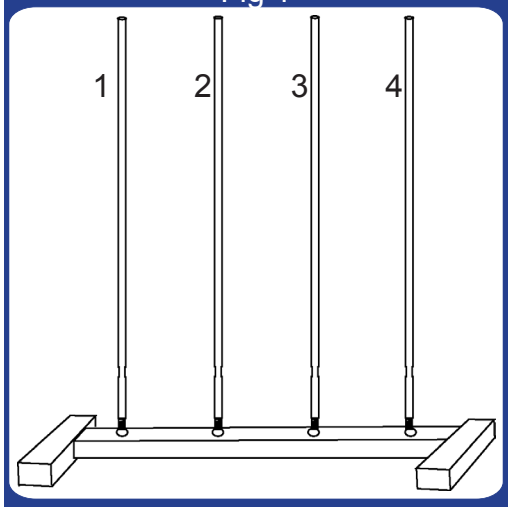
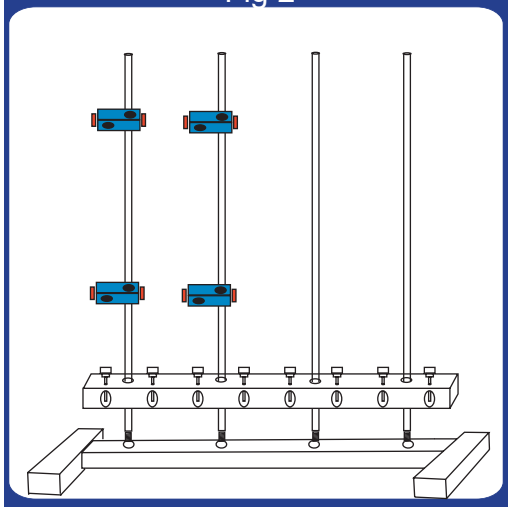


Fig 1



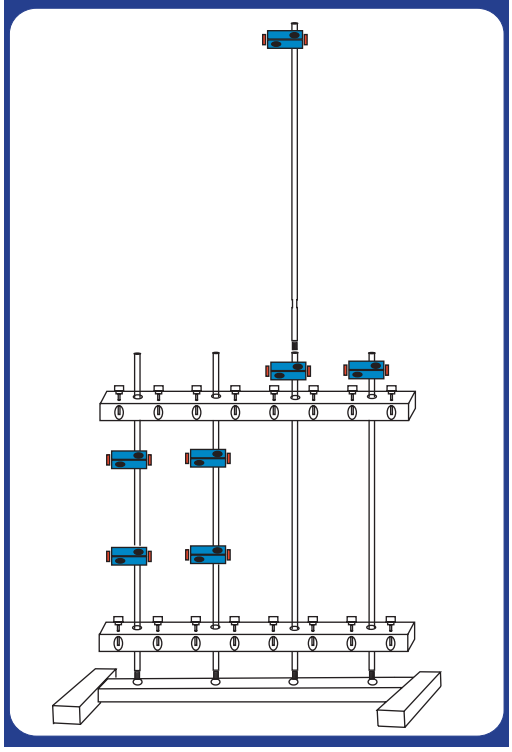
Place base on lab bench where it will be used. Screw in 24” SS rods into base.

Fig 2



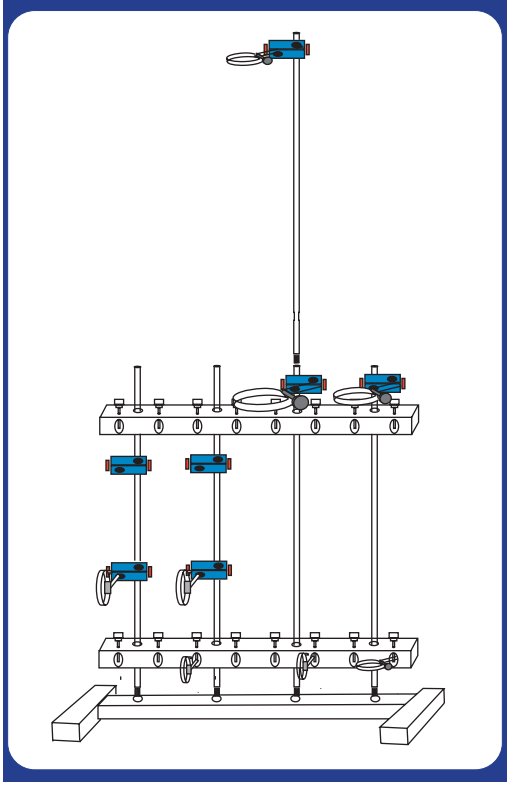
Slide a Stabilizer bar onto the rods about 4” from the base. Slide 2 stand clamps onto rods 1 and 2 onto rod 2.

Fig 3



Slide the other Stabilizer bar onto the rods about 2” from the top. Srew in a 24” SS rod into rod 3. Slide a Stand Clamp onto rod 3 and 4 just above the stabilizer bars. Slide a Stand Clamp on rod 3 36” from the base.

Fig 4

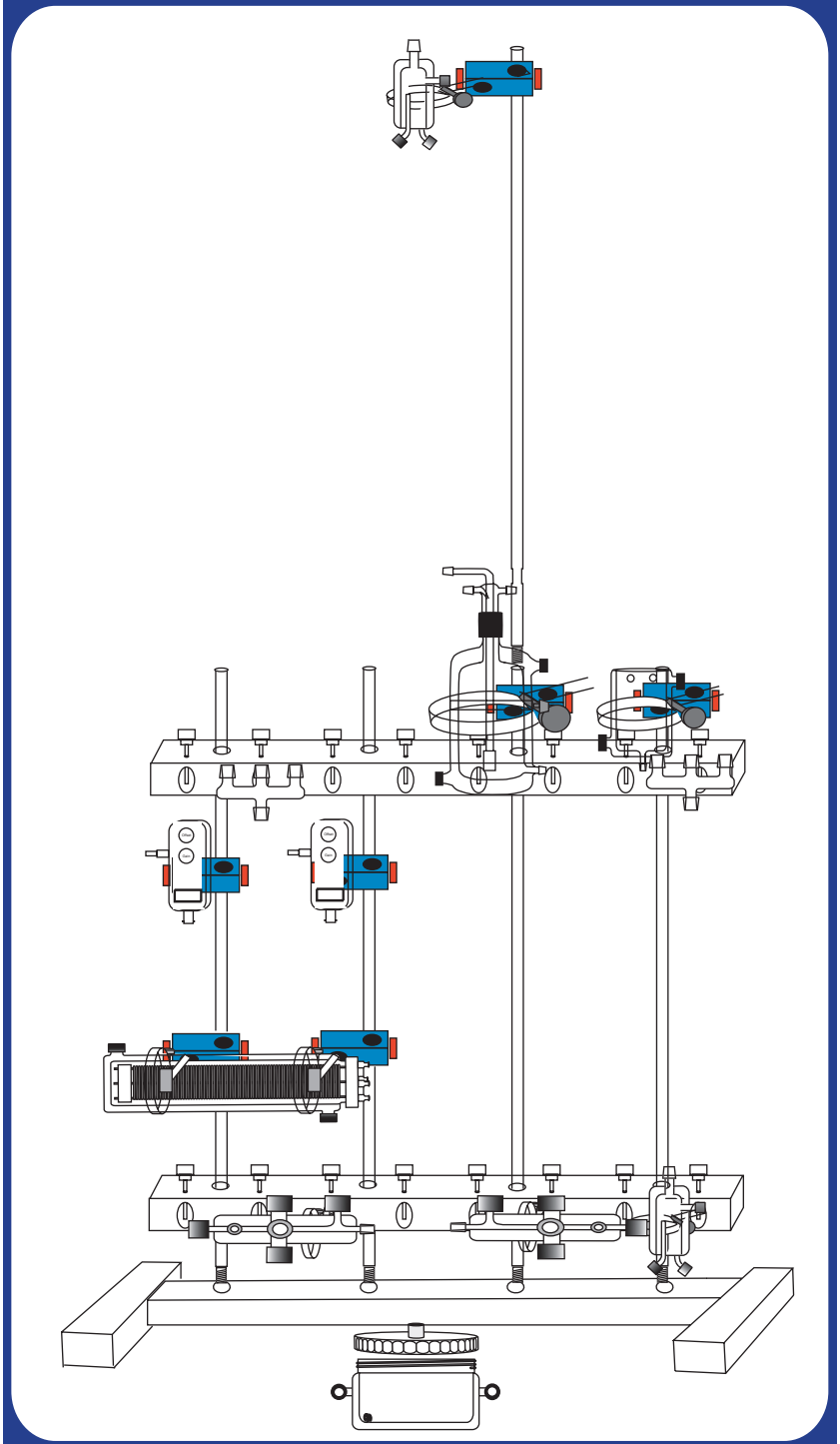


Place the ring clamps for the bubble traps(F) in the stand clamp on top of rod 3 and the hole all the way to the right on the lower stabilizer. Place the ring clamps for the oxygenator(D) in the lower stand clamps on rods 1& 2. place the ring clamps for the resevoirs (G & H) in the upper stabilizer.place the ring clamps for the inflow and outflow manifolds (E) in the lower stabilizer.

227 West Maple Ave Monrovia, CA. 91016 - Phone: 626 357-8827 Toll Free: 800 428-1416 Fax: 626 303 2998
radnoti.com

Radnoti

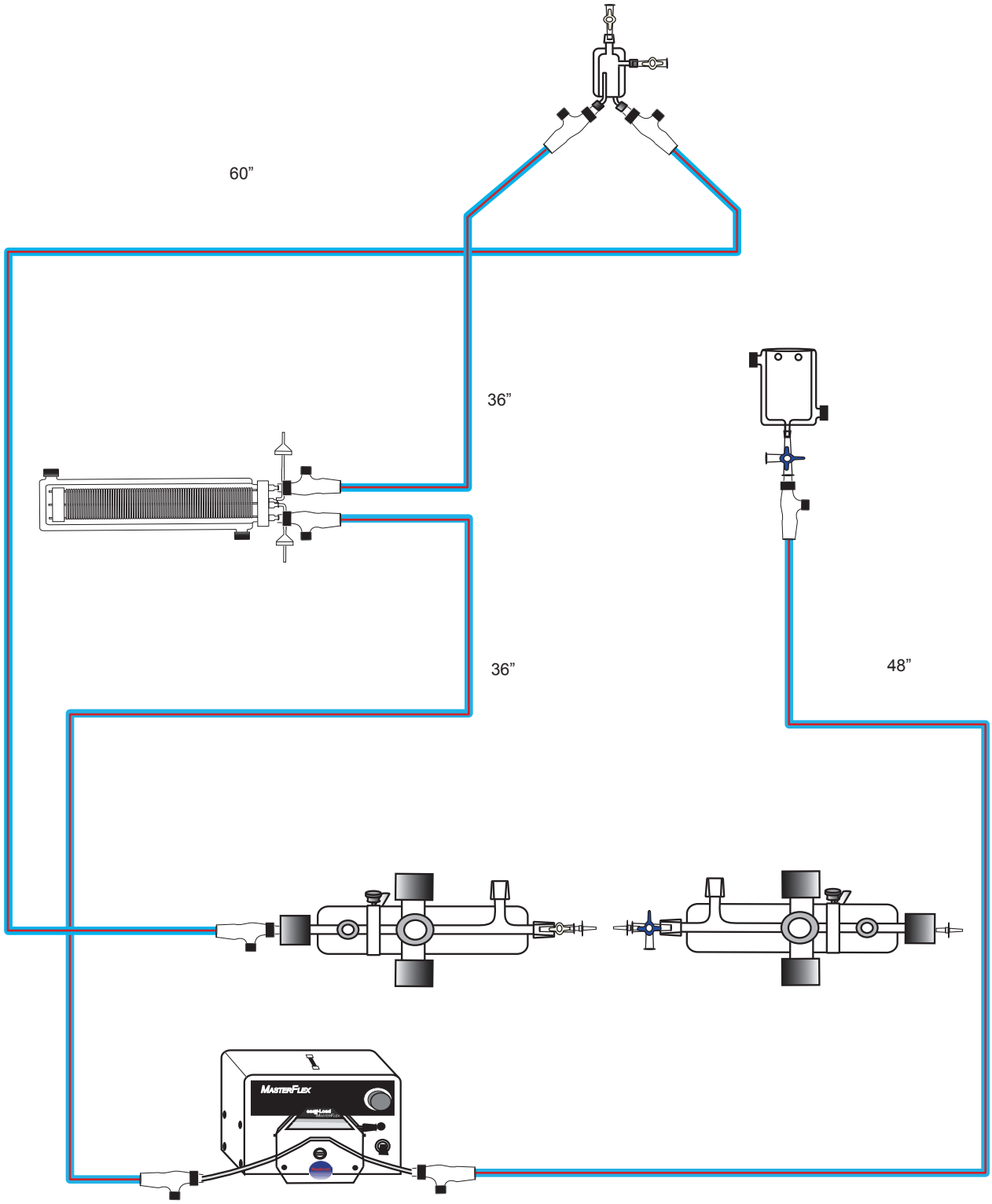
Fig 5



Place transducers into the Stand clamps on top of rods 1 & 2. Place Bubble Traps into the ring clamp on top of rod 3 and ring clamp all the way to the right on the lower stabilizer. Put the membrane oxygenator in the ring clamps on rods 1 & 2. place inflow and outflow manifolds in the ring clamps in the lower stabilizer. Place the .5 liter resevoir and 100ml resevoir in the ring clamps on the upper resevoir

WARNING: Mounting the glass components on ring clamps (careful not to over tighten)

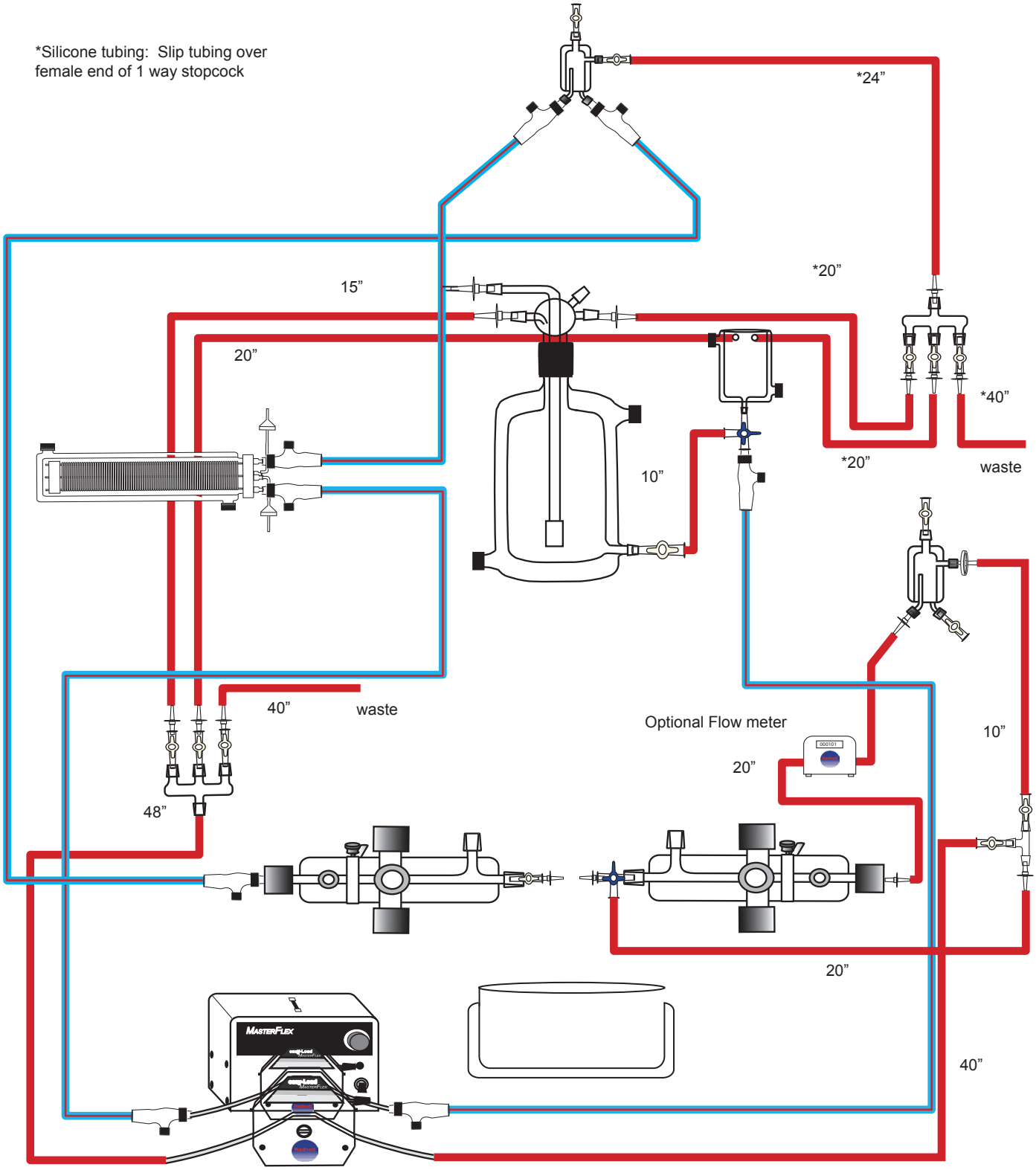
Flex Tube Assembly Chart



227 West Maple Ave Monrovia, CA. 91016 - Phone: 626 357-8827 Toll Free: 800 428-1416 Fax: 626 303 2998
radnoti.com

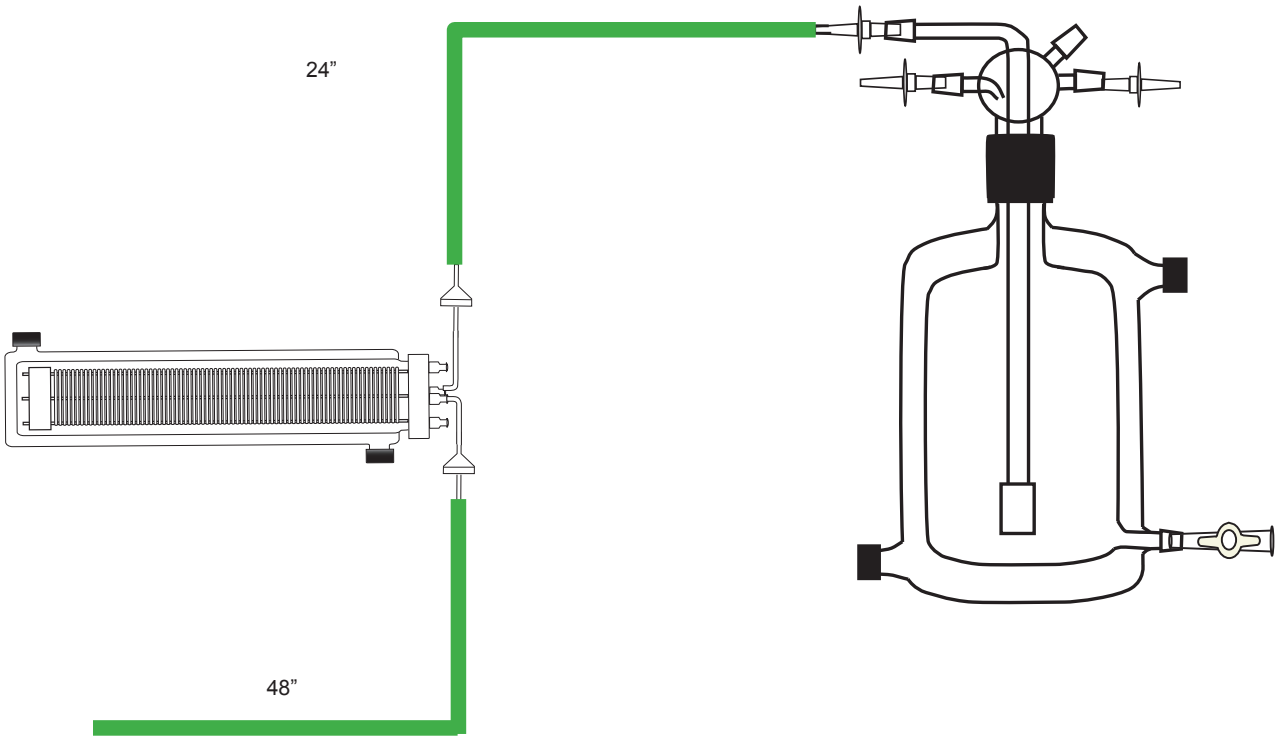
Radnoti

Perfusate Connection Chart



227 West Maple Ave Monrovia, CA. 91016 - Phone: 626 357-8827 Toll Free: 800 428-1416 Fax: 626 303 2998
radnoti.com

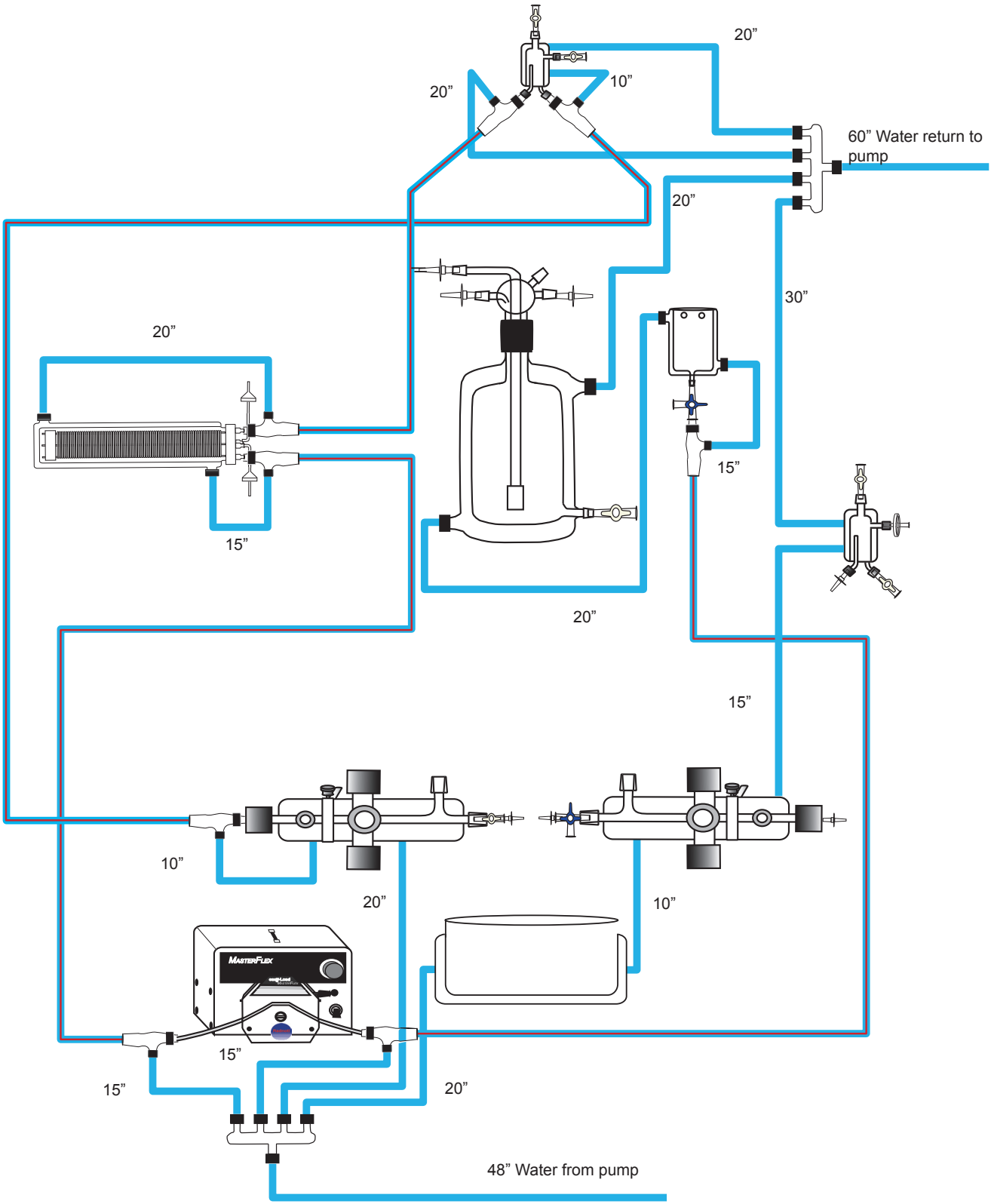
Gas Connection



227 West Maple Ave Monrovia, CA. 91016 - Phone: 626 357-8827 Toll Free: 800 428-1416 Fax: 626 303 2998
radnoti.com

Radnoti

Water Jacketed Connection Chart

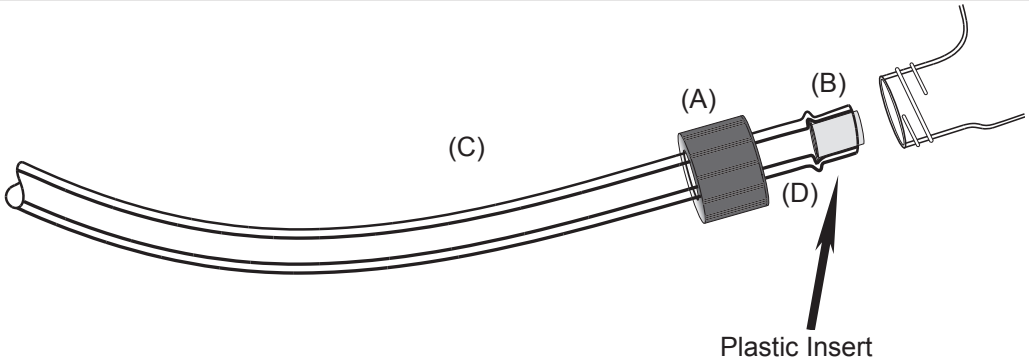


227 West Maple Ave Monrovia, CA. 91016 - Phone: 626 357-8827 Toll Free: 800 428-1416 Fax: 626 303 2998
radnoti.com

RADNOTI ‘QUICK DISCONNECT” INSTRUCTIONS

For Reference only

A		Slide Cap-With hole onto the water line. (Tygon tubing #120159)
B		Push the plastic sleeve insert into the end of the Tygon tubing with the flared end first. (Catalog #120160)
C		Be sure to use 5/16 x 3/16 inch Tygon tubing. (Catalog #120159)
D		MOISTEN TIP OF TYGON TUBING before insertion into the threaded glass.
		CAUTION: To avoid breakage, do not over tighten the screw cap.



Replacement Part List:

Catalog No.		Description
120160		Plastic sleeve insert, 25/Pkg
120159		Tygon tubing 5/16 x 3/16 ID, 50 ft/min
160196		Drilled cap for W/J.Q.D.

227 West Maple Ave Monrovia, CA. 91016 - Phone: 626 357-8827 Toll Free: 800 428-1416 Fax: 626 303 2998
radnoti.com

Instruction Manual
Radnoti 159905 Micro Pressure Transducer With Amplifier

Setup:

Connect 8 pin power supply connection to amplifier.
Connect output BNC connector to recording device.
Plug sensor connector into amplifier.

Calibration:

Make sure to let the amplifier warm up for about 10 minutes before calibration.

The output of the amplifier is 0 to about 3.2 volts full scale. This allows for precise calibration of 10mv/mmHG.

1. Connect a pressure calibration bulb and gauge to the pressure transducer.
2. Turn the Gain control fully clockwise.
3. Zero the amplifier to about 000 on the readout using the Offset control.
4. Inflate the system to 150mmHG and hold.
5. Turn the gain control until the display shows 150.
6. Deflate to zero and readjust to 000
7. Inflate again to 150mmHg and readjust Gain.
8. When pressure is at zero the readout should show 000 and when at 150 the readout should show 150.

Handling:

The tip of the fitting is filled with a pressure transferring gel. It is important not to disturb this gel as it may degrade the performance of the transducer.
It is very important not to drop the fitting on its open end. At the tip of the fitting there is a small glass housing that may be damaged.

MI-710
Micro-combination pH Microelectrodes
Operating Instructions

The microelectrode is ready to use. Carefully unwind the tape and remove the probe from the protective glass tube. The white translucent sleeve, which covers the hole, should be moved down the glass barrel slightly to ventilate the reference chamber and replaced after each use.
The use of a separate Reference Electrode is not required.

Calibration

The probe can be held by hand when measuring pH. It has been standardized in two (2) pH buffers. Follow the procedure recommended by the manufacturer of your pH meter for calibrating your pH meter with our microelectrode.
Optimum Response Time: Optimum response time will be obtained after the probe has been exercised in two (2) buffer solutions. Fill one beaker with a pH 4 buffer or equivalent and a second beaker with a pH 7 buffer or equivalent. Hold the microelectrode and touch the pH 4 buffer surface allowing 5 seconds for equilibration, and then touch the pH 7 buffer surface in the same manner. Do this several times. It is not necessary to rinse the probe because the carry-over is negligible.

Signal Generation pH Electrodes

Ideally a pH electrode will output a voltage of 0mV in a pH 7 buffer. This can very by +/- 50mV based on the individual pH electrode.
The Nernst equation tells us that a pH buffer 4 should be 160mV greater (more positive) than the reading in a pH 7.
The reading in a pH10 should be -160mV less (more negative than that of a reading in a pH7 buffer.
The 160 comes from being 3(7-4)*59(Nernst value at 20 degrees)=168mV for 100% slope and 160 is slightly less than 100% theoretical.

Handling

The outer reference chamber of the microelectrode can be refilled when necessary with the 3 M KCl solution, using the bulb pipette. The reference chamber should be filled slowly.
Be careful not to apply pressure against the inner glass capillary tube.

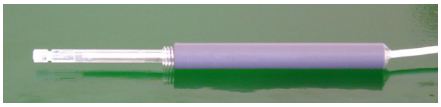
Cleaning

When using the microelectrode in solutions containing protein, it should be soaked in an enzyme cleaning solution such as Terg-a-zyme (Alconox, Inc.) or a chromic/sulfuric acid glass cleaning solution for a couple of minutes after each use to remove the protein from the glass and the reference junction. This will prolong the useful life of the microelectrode.

Storage

Always clean the microelectrode before storing:
Long-term (over 2 weeks): Return the probe to its original container and prepare it in the same condition in which you received it. Usually this means simply moistening the sponge located in the bottom of the protective glass tube with pH 4 buffer.
Short-term: The probe can be left in an acid pH buffer solution (pH 4).

MI-730
O2 Microelectrodes
Operating Instructions



The MI-730 Electrode Kit contains the following:
1 Oxygen Electrode with membrane housing
6 Replaceable membrane housings
1 Bottle of electrolyte
1 Filling tip
1 Set of instructions
5 Polishing pads

Electrode Assembly and Preparation

1. Remove the acrylic housing from the Oxygen electrode by unscrewing it from the electrode body. This housing, with affixed Teflon membrane, does not contain the necessary oxygen electrolyte solution.
2. Add oxygen electrolyte solution to the acrylic housing. This is accomplished by attaching a filling tip to the bottle of electrolyte and adding the electrolyte to the housing to a minimum height of 6 mm. Gently place the bubble-free end of the filling tip against the Teflon membrane and release the electrolyte to the minimum height.
3. Insert the housing on to the Oxygen electrode, being careful not to trap any air bubbles near the electrode tip. The housing is screwed clockwise into the body of the electrode until it stops. Check the tip of the electrode for proper seating of the housing against the electrode. The electrode is properly seated if the electrode protrudes slightly beyond the end of the housing.

Calibration

Calibration of the electrode requires the use of two standard gases with percent values that are close to the percent values of Oxygen to be measured. Common values used are 0% Oxygen for zeroing and 21% Oxygen (Ambient Air) for sloping or gain.

A. Calibration for gas samples:

When samples to be measured are gaseous, then calibration should be performed with humidified gases. Two possible setups for calibrating the electrode are shown below. Keep the tip of the electrode as far as possible from the surface of the water. The bubbling rate of the gas should be slow (3 - 6 bubbles per second). Although bubbling at a faster rate will flush the chamber more quickly, it will also cause a cooling effect on the electrode.

1. Bubble the 0% gas through the chamber and adjust the zero of the meter after a stable reading is obtained. It may take up to 15 minutes to de-gas the chamber of contaminants, however bubbling the gas vigorously will cause droplets to collect on the tip of the electrode. This will make the electrode

2. Bubble the 21% gas (or any other percent value you decided to use for your application) through the chamber until a stable reading is obtained. Adjust the calibration control to 21%.
This procedure of alternating between the two gases should be continued until you become confident of stability and reproducibility. The electrode is now ready to use.

B. Calibration for liquid samples

To decrease calibration time, two separate calibration chambers should be used. One for the 0% gas and another for the sloping gas such as 21%. When setting up the calibration chambers initially, it will take up to 30 minutes to flush each chamber to obtain a steady state oxygen level and a constant temperature. Again the bubbling rate should be carefully regulated (3 - 6 bubbles per second) so that both calibrating liquids are at the same temperature.
Calibrating standards and samples must be at the same temperature for accurate Oxygen measurements.

1. Immerse the tip of the electrode into the 0% standard and adjust the zero of the meter after a stable reading is obtained.
2. Remove the electrode from the first standard and place it into the second standard. Adjust the calibration control to the value of the second standard (ex: 21%)

Alternate between the two standards until you become confident of stability and reproducibility. The electrode is now ready to use.

Handling

When necessary, the membrane of the electrode can be replaced by following the assembly procedure above. When removing and replacing a membrane as well as when calibrating or making measurements, be careful not to apply pressure against the internal electrode. Any excessive pressure against the internal electrode can cause the electrode to crack rendering it useless and unrepairable.

Cleaning

When using the electrode in solutions containing protein, the electrode should be soaked in an enzyme cleaning solution such as Terg-a-zyme (Alconox, Inc.) after each use for a couple of minutes to remove the protein from the membrane surface. This will prolong the useful life of the membrane.

Storing

Always clean and rinse the electrode before storing:
Long-term (over 1 month): Remove the membrane housing from the electrode. Rinse the internal electrode with distilled water and pat dry. Place a new, unfilled membrane housing over the internal electrode and attach loosely (Do not seat completely). This membrane will serve to keep the dust off of the electrode tip.
Short-term: The electrode can be left in room air with membrane housing still attached.

Output Conversion

Formula for conversion of percent oxygen to solubility in moles/liter:

S= (a/22.414) x (760-p)/760) x (r%/100)

S = solubility of gas in moles per liter

a = absorption coefficient of gas at temperature

P = vapor pressure of water at temperature

r% = actual reading in percent Oxygen

Temperature (T) vs. absorption coefficient (a) for oxygen in water:

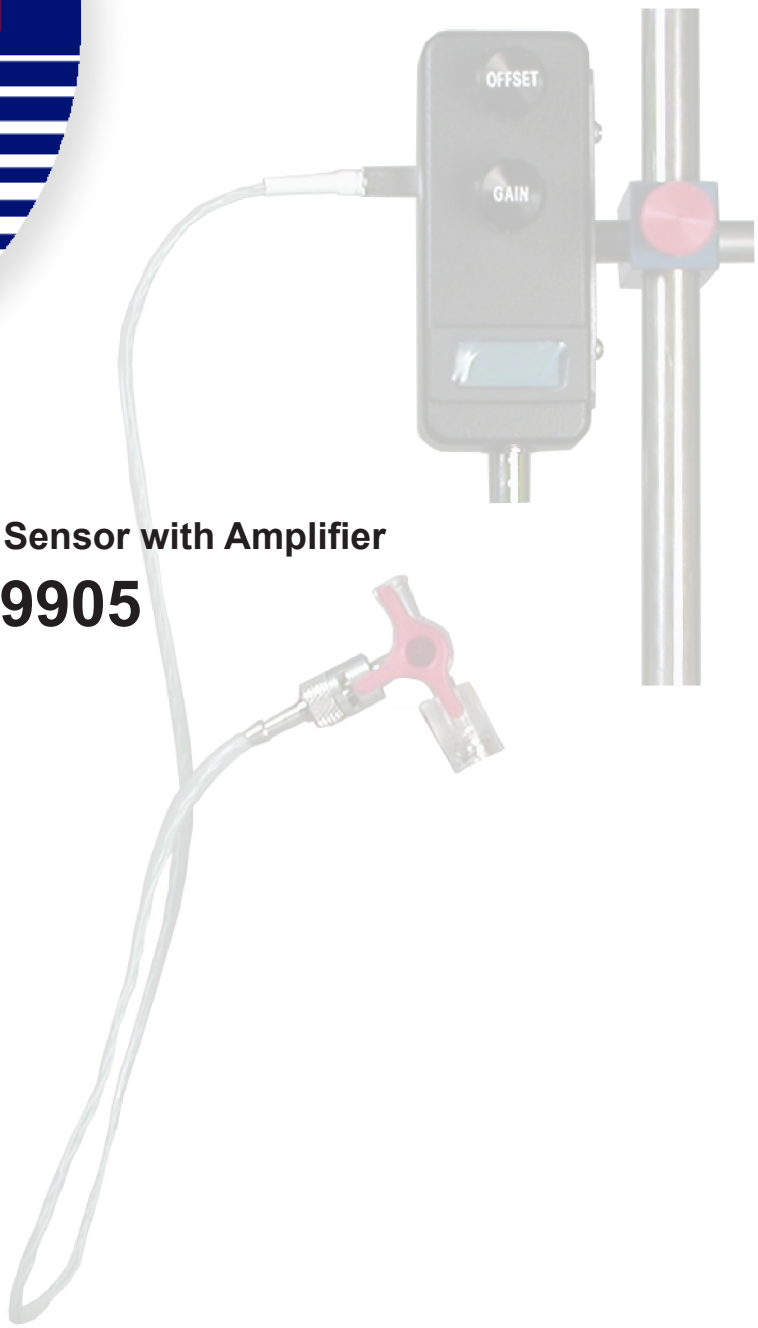
T	a	T	a
5	.04287	19	.03161
6	.04180	20	.03102
7	.04080	21	.03044
8	.03983	22	.02988
9	.03891	23	.02934
10	.03802	24	.02881
11	.03718	25	.02831
12	.03637	26	.02783
13	.03559	27	.02736
14	.03486	28	.02691
15	.03415	29	.02649
16	.03348	30	.02608
17	.03283	35	.02440
18	.03220	40	.02306

T = Degrees Celsius

a = Absorption Coefficient

227 West Maple Ave Monrovia, CA. 91016 - Phone: 626 357-8827 Toll Free: 800 428-1416 Fax: 626 303 2998
radnoti.com

Radnoti



Radnoti Pressure Sensor with Amplifier

159905

®Radnoti 2006

Setup:

Connect 8 pin power supply connection to amplifier.
Connect output BNC connector to recording device.
Remove protective cover from sensor.
Plug sensor connector into amplifier.

Calibration:

Make sure to let the amplifier warm up for about 10 minutes before calibration.

The output of the amplifier is 0 to about 3.2 volts full scale. This allows for precise calibration of 10mv/mmHG.

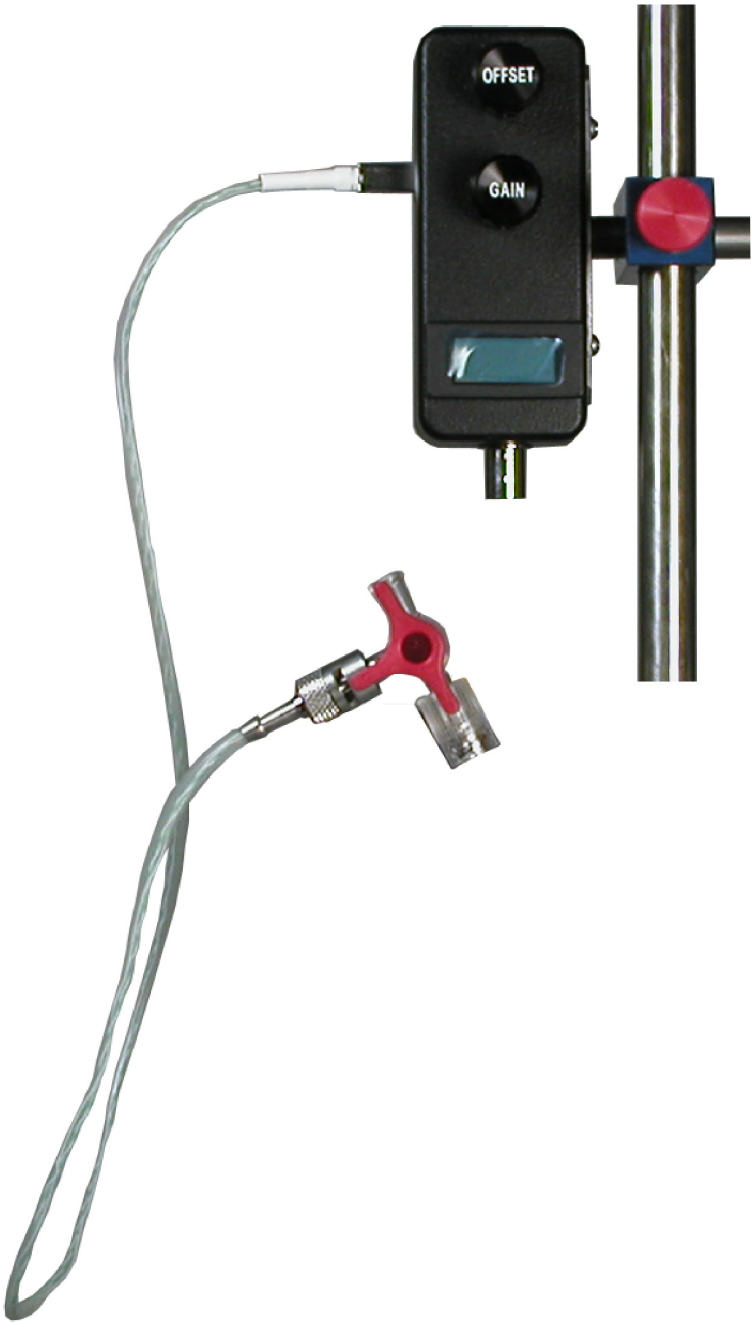
1. Connect a pressure calibration bulb and gauge to the pressure transducer.
2. Turn the Gain control fully clockwise.
3. Zero the amplifier to about 000 on the readout using the Offset control.
4. Inflate the system to 150mmHG and hold.
5. Turn the gain control until the display shows 150.
6. Deflate to zero and readjust to 000
7. Inflate again to 150mmHg and readjust Gain.
8. When pressure is at zero the readout should show 000 and when at 150 the readout should show 150.

Handling:

The tip of the fitting is filled with a pressure transferring gel. It is important not to disturb this gel as it may degrade the performance of the transducer.
It is very important not to drop the fitting on its open end. At the tip of the fitting there is a small glass housing that may be damaged.

159905

Radnoti



227 West Maple Ave Monrovia, CA. 91016 - Phone: 626 357-8827 Toll Free: 800 428-1816 Fax: 626 303 2998
radnoti.com