Master/Slave Probe User Notes

1. Description:

The Master/Slave probe system is available for all monitors.
There are several reasons for using the system:

1. Slave probes offer finest diameter probe tips (down to 250micron for single fibre designs) for minimally invasive measurements.

2. Choice of Slave probes for diverse measurements - connect a new slave probe tip for a change to muscle, cerebral, gastric, organ or endoscopic (etc.) application. This represents an economic solution if you intend to sample a number of different tissues.

3. Slaves can be supplied with factory prepared fixed connectors or re-usable, detachable connectors. Probes tips with re-usable connectors can be sterilised easily for re-use or treated as disposable. Moor Instruments can also supply the materials for you to construct your own slave probes.

4. For longer-term measurements the Master can be disconnected to leave the Slave in position between sampling periods.

Master probes are twin fibre designs, acting as a link between the monitor and the single fibre Slave probe tip. The Master probe connects to the Slave via an optical in-line connector. The Slave probe both transmits to and receives light from the tissue.

2: Connecting Master to Slave: Fixed Connector. (see P10a, c, d-NYL, d-SIL, e, f, g, ICP, r, s-TCG).

a. Gently wipe the optical face of the Master and Slave probe with lens tissue (PLT-1) and alcohol.
b. Apply a small quantity of optical matching gel (PMG) to each face.
c. Insert both Master and Slave into the Inline connector.

3: Connecting Master to Slave: Detachable Connector. (see P10b, d, d-NYL, d-SIL, e, f, k, s).

First, refer to instructions on stripping and cleaving Slave probes, section 4.

a. Gently wipe the optical face of the Master probe and the detachable Slave connector with lens tissue (PLT-1) and alcohol.
b. Thread the short length of silicon tube onto the prepared Slave tip (connector end), approximately 2cm from the optical surface.
c. Clean the Slave tip (connector end) with lens tissue (PLT-1) and alcohol.
d. Loosen the knurled brass nut on the slave connector and thread the prepared slave through so that the fibre just protrudes form the connector face and approximately 1cm of silicon tubing is inside the connector.
e. Using your clean thumbnail, push the fibre back so that the fibre is flush with the connector face.
f. Tighten the knurled nut.
g. Apply a small quantity of optical matching gel (PMG) to the optical surfaces of the Master and Slave probes.
h. Insert both into the Inline connector.
i. Tighten the knurled nut to fully secure the slave fibre in place.

4. Stripping and Cleaving Detachable Connector Slaves and probe tips

Warning: Cutting optical fibre presents a hazard due to the equipment used and the fact that in cleaving, cut fibre can cause damage to tissue and eyes. Always wear safety glasses and prepare the fibres away from other people.

Plastic Fibre: Use a new scalpel blade to cut the fibre back. Lay the slave probe onto a hard flat surface (metal or thick glass plate) and cut straight down.

Glass Fibre: All glass fibres are usually protected by a plastic sheath (apart from TCG type). If present, this must be stripped prior to cleaving. You will need the Adjustable Fibre Stripper (PST) and Sapphire Cleaving tool (PCT) available from Moor Instruments. For 200 micron slaves set the stripping tool to 25. For 400 micron slaves, set the tool to 45 instead. Strip approximately 10mm off the sleeving.
Carefully score the exposed fibre about 1mm from the tip, then break off the tip by gently pushing the fibre with the cleaving tool.

5. Checking Optical Efficiency.

Connect the combined Master/Slave probe to the monitor. Select Probe 0 and turn on the laser. Ensure the output end of the slave is clean and dry with the end in air, not in contact with tissue.
Note the DC value. DC is a measure of the intensity of the backscattered light. In air, the single fibre acts like a mirror and DC will typically be 50 or more, even to the point of saturation. When the fibre tip is immersed in water, DC should drop to a significantly lower value, 30 or less, as the light is transmitted into the water.

If you do not notice the drop in DC then the probe will not function properly for blood flow measurements. Repeat the assembly procedure, ensuring the optical surfaces are clean and then apply fresh optical matching gel.

If the DC values between air and water do not change as required, check the optical integrity of the dual fibre Master by disconnecting the Slave and disconnecting from the monitor. Hold the connector of the Master probe to a bright light source. You should notice two bright points of light on the optical surface. If not, please consult Moor Instruments.

Note Air/Water changes with the P10e are usually less marked.

6. Calibration.

The normal calibration procedure is used; however the following are additional notes. Care must be taken in supporting the single fibre do that the tip is 5 to 10mm below the surface of the motility standard. Do not squeeze the fibre during calibration, as light may be lost from the fibre sides. Clamp lightly in position for calibration and use tissue paper if necessary to cushion the fibre. Ensure the fibre is free from vibration or motion during the procedure.

7. Measurements.

To check the performance of the single fibre probe, measurements can be made from a warm finger. To ensure good optical transmission a drop of water or Vaseline should be applied to the area. The quality of the signal recorded can be checked by occluding the finger by means of a pressure cuff or by tightly squeezing the wrist of the volunteer. A decrease in flux should be observed followed by an increase upon release. Apparent changes in flux due to fibre or patient movement may also be recorded unless care is taken.

For further information or advice regarding your application, please contact Moor Instruments.