Some information for using PMEL sensors on the EX CTD:

General consideration (Seasave Instrument Configuration):

General settings we usually use are as follows:

- OK to suppress frequency channels if full suite of ducted T/C sensors are not being used
- Do not suppress any voltage channels, even if not all channels have sensors in them
- average 24 scans in the deck unit (1 scan = 1 sec)
- Add scan time (adds system time to each scan) – it is important to make sure the CTD data acquisition computer time is set to the same time standard used for all other systems (ie, GPS time)

Note: I don't recall if you have surface PAR or NMEA data set up for your system, so am not commenting on that.

Light Scattering Sensor (aka Seapoint turbidity sensor or Optical Backscatter Sensor (OBS))

Mounting: The LSS can be mounted with tie wraps and black tape in any orientation - just be sure the flat face of it is not covered with tape, has good (~6-8" at least) clearance from other objects, and lanyards from bottles can't dangle in front of it. It is preferable to place it someplace on the CTD cage (not the outer package frame) for protection.

Seasave setup:

- Sensor type is "OBS, Seapoint Turbidity"
- Our sensors are a custom sensitivity, and we report data from this sensor in NTU (Nephelometric Turbidity Units, a dimensionless unit) which is, conveniently, the same as the voltage output of the sensor. So, it is not necessary to enter any calibration constants. HOWEVER, be sure to select voltage for this channel for output to plots, displays or in the data processing modules. A good range for plot displays is 0-0.2 volts. Typical values in the clean, mid-water minimum (what we call "background") will be ~0.01v.
- The equation in the Seabird software is: output=(V * 500 * scale factor)/gain
  So you can enter scale factor = 1.0 and gain = 500 to make sure output=voltage in case the sensor is selected for output rather than the A/D channel voltage, HOWEVER, I find it far more clear and less confusing to select the A/D channel voltage for the outputs so you know exactly what you are getting.

Between casts: The LSS does not require any cleaning or other maintenance between casts, but if data becomes excessively noisy it may have become fouled (ie, sea snot, or lanyards or a loose end of tape are waving in front of it – clean off and/or re-secure as necessary). It is normal to have occasional spikes (that won't last more than a second or two) in the data because large particles can come within sensing range.

Oxidation-Reduction Potential Sensor (ORP)

Mounting: The ORP sensor can be mounted with hose clamps and/or tie wraps and black tape in any orientation. It is preferable to place it someplace on the CTD cage (not the outer package frame) for protection. It is a good idea to position it so the cap (with fluid in it) can be easily removed and replaced.

Seasave setup:

- Some versions of Seasave give a sensor type option of "Oxidation Reduction Potential", otherwise, select "User Polynomial"
- If "Oxidation Reduction Potential" is selected: M = 200, B = -500, offset = 0
- If "User Polynomial" is selected: A0 = -500, A1 = 200, A2 = 0, A3 = 0

- The “background” value for this sensor type varies and may drift some during a cast (so the upcast values are rarely the same as the downcast values which can make for some odd-looking profile plots). However, what is significant is a change of more than a few millivolts in a second, especially if this change coincides with a LSS signal. A good range to begin with (for plots) is probably 0-150 mv.

Between casts: It is best to keep the porous junction (white material in center of the black end on sensor) from drying out completely. The sensor was shipped with a black cap filled with saturated potassium chloride (KCl) solution covering the sensor. Remove the cap before deploying the CTD. The cap does not have to be replaced between every cast, especially if the next operation is only an hour or so away. If the CTD is going to be out of the water for more than a couple of hours, please put the cap back over the sensor. It is fine to use seawater (preferably clean, filtered seawater) instead of KCl solution. Two things to be careful of during cap removal/replacement: 1) pull cap straight on/off – do not twist or the sensor could become loosened from the end cap and cause the pressure case to leak (the cap does not have to go on very far, just cover the end of it); and 2) be careful not to bend or break off the platinum wire on the outside wall of the sensor (the vinyl cap is soft enough that you should be able to squeeze it out of round to slip it past the tip of the platinum wire without catching it).

Benthos altimeter

Mounting: The altimeter needs to be mounted securely (hose clamps probably the best option) to your CTD frame with the transducer end pointing downward and unobstructed by any other part of the frame, but with some clearance so the transducer is not scraped or otherwise damaged when the frame is set on the deck.

Seasave setup:

- Sensor type is “Altimeter”
- Scale factor = 14.98, offset = 0
- This altimeter has a range of 0-100 m. However, it does not reliably begin to “see” the seafloor at 100 meters above bottom. When the CTD is out of range, the altimeter value will be ~98-99 m. **SLOW THE WINCH AS SOON AS YOU SEE THIS VALUE BEGIN TO CHANGE (the numbers may seem random at first).** You will probably be around 35-40 meters above bottom once the winch slows down and the numbers become stable. Ideally, we want to get to ~20 meters above bottom during casts. With good conditions and a vertical cast, you can safely get closer. During tows, especially when travelling upslope and the bottom coming up as the CTD moves down, it is best to err on the side of caution. When in doubt, stop the winch and come back up!

Between casts: The altimeter requires no special attention or maintenance between casts.