Newtons4th Ltd
office@newtons4th.com
www.newtons4th.com

N4L Newtons4th Ltd

APPLICATION NOTE - 005
Measuring fluctuating signals with the PSM2200 & PSM2201

The PSM range are real-time analysis instruments that simultaneously acquire and process data, once the input conditions are valid. The default set up conditions for each instrument are most suitable for measuring steady state, or slowly fluctuating signals – for rapidly fluctuating signals there are three areas where the response of the instrument can be improved using the menus or the communication commands:

1. Input ranging
2. Filtering
3. Frequency determination

1. Input ranging

All PSM units have input ranges spaced by a factor of about 3 (10mV, 30mV, 100mV etc.). If the input overdrives the selected input range then the measurement cannot be valid. The default ranging mode is full autoranging so the instrument will always find an appropriate range but *measurements cannot be made during the autoranging process and data will be missed*. To prevent this, the range can be fixed manually to the highest range that would be needed, either from knowledge of the maximum input signal, or by setting the ranging mode to autorange upwards only and running for a time to allow the highest range to be selected.

Function	Using menus	Using communications
To select the lowest range	Press CH1 or CH2 Press DOWN to highlight "minimum range" option Press RIGHT or LEFT to select Press HOME twice to exit	RANGE,channel,ranging,range eg. RANGE,CH1,MANUAL,10V RANGE,CH2,UPONLY,100MV
To select the ranging mode	Press CH1 or CH2 Press DOWN to highlight "autoranging" option Press RIGHT or LEFT to select Press HOME twice to exit	

To quickly lock or unlock the range	Press CH1 or CH2
	Press STEP to toggle between:
	    manual, present range
	    full autorange, 10mV
	Press HOME twice to exit	

To reset the range when using "autorange up" only	Press HOME	*TRG

2. Filtering

The measurements from the PSM2200/1 are filtered equivalent to a first order low pass filter, nominally 1.5s at default settings (normal filter). The filter can be disabled, or it's time constant can be increased (slow filter). To speed up the response of the instruments to step changes, the filter has an auto reset function that flushes the filter in the event of fluctuating results. If the input is noisy or rapidly fluctuating this may result in the filtering being reset for every result, so the filtering is ineffective. To disable this auto reset function, the filter can be set to "fixed time" so that every result is passed through the filter.

Newtons4th Ltd
office@newtons4th.com
www.newtons4th.com

Function	Using menus	Using communications
To select the filter type	Press SETUP Press NEXT until the menu "ACQUISITION CONTROL" is found. Press DOWN to highlight "filter" option Press RIGHT or LEFT to select Press HOME twice to exit	FILTER,type,dynamics eg. FILTER,NORMAL,FIXED FILTER,SLOW,AUTO
To select the filter mode	Press SETUP Press NEXT until the menu "ACQUISITION CONTROL" is found. Press DOWN to highlight "filter dynamics" option Press RIGHT or LEFT to select Press HOME twice to exit	
To flush the filter when using "fixed time" filtering	Press HOME	*TRG

3. Frequency determination

In order to perform Fourier analysis (as used in Vector Voltmeter, LCR, gain/phase analyser, and other modes) the frequency needs to be accurately known. When using the instrument's own generator, the frequency is known; when not using the instrument's own generator (output turned off), the frequency is measured from the input signal on CH1. If the measured frequency varies then the instrument cannot make a measurement until it has determined a stable frequency. If using an external generator of known stable frequency, the PSM2200/1 can be forced to use the known frequency by enabling it's generator at the same frequency (turn the output on but leave the output disconnected).

Function	Using menus	Using communications
To set a manual frequency	Press OUT Press DOWN to highlight "frequency" option Enter the known frequency and press ENTER Press DOWN to highlight "output" option Press RIGHT or LEFT to select "on" Press HOME twice to exit	FREQUE,frequency OUTPUT,ON eg. FREQUE,2.4E3;OUTPUT,ON