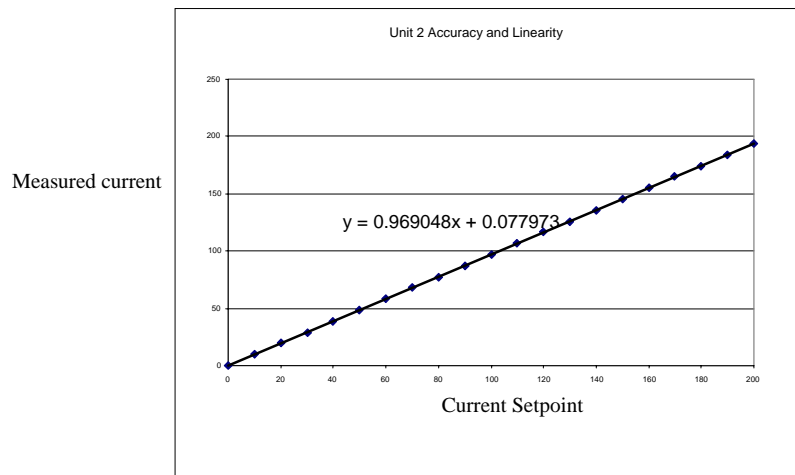
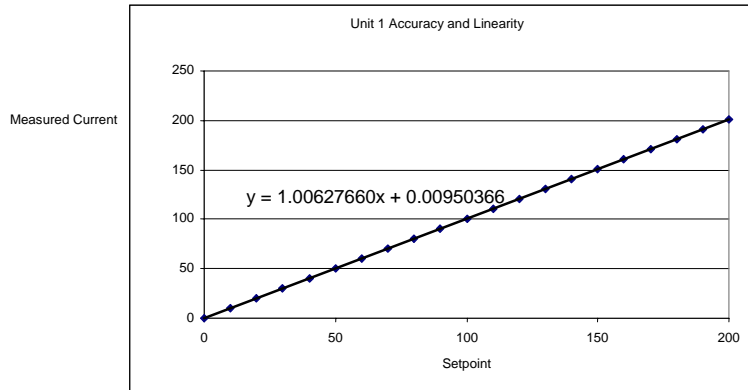


## Accuracy and Linearity

The specification requires the power converter to have an absolute accuracy to within 50 ppm. This has been measured across the range of current from 0 to 200 A, full rated output. The results are presented graphically on the following tables.

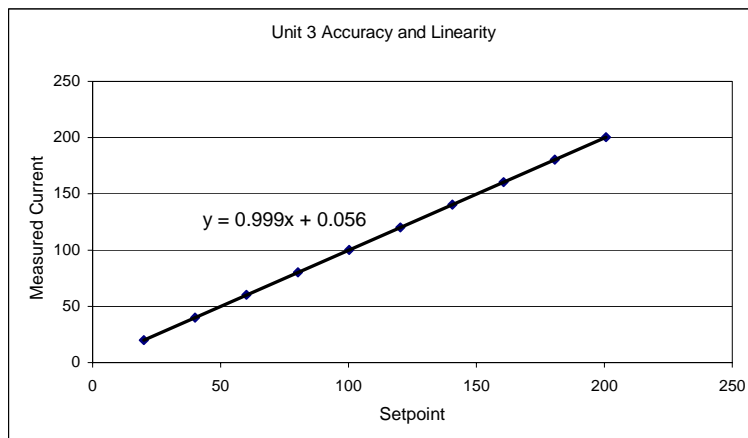


The equation of the line of best fit is shown on each graph, and this gives the offset and gain errors of the power converters. It should be possible to calibrate each power converter to remove these errors but as the units stand, unit 2 has an absolute accuracy of 3% or 30000 ppm and unit 1 has an absolute accuracy of 0.6% or 6000 ppm. Neither unit meets the absolute accuracy requirement of 50 ppm. No information of performing a calibration was provided.

*It is recommended that full instructions for performing a calibration be required.*

The linearity is how close each unit's set of results fits to a straight line and will provide a measure of the units accuracy over the power range following a calibration. unit 1's maximum deviation from the straight line is 16 ppm. Unit 2's maximum deviation from the straight line is 20 ppm. In each case, any anomalous value at either extreme of the range has been excluded as the feedback circuit may be at a zero or may be saturated.

Linearity data were also provided for a unit 3. However, the data were only provided at 3 significant figures, so it is not possible to determine whether the power converter meets the requirements for Diamond. The data are presented graphically below.



## Ripple

The prototype specification requirement was for current ripple at less than 2 ppm at frequencies upto 300 Hz.

The ripple generated by Unit 1 and unit 2 are shown in the following graphs. In the case of the unit 2, the ripples are a result of voltage fluctuations in the dc output due to the IGBT chopper circuit which is switching at 20 kHz, the same frequency as the measured ripple. In the case of unit 1, the ripple is due to voltage fluctuations in the dc output of the high frequency rectifier stage. The ripple frequency is 40 kHz, twice the switching frequency of the H bridge. The ripple from unit 1 is reduced by the use of a larger filter. Also, the linear regulator will not add more ripple to the output.