IN2xx code　　　　　　　Zanduino library　　　　　　SensESP INA2xx

Setting of Max Expected Amps and Shunt values, testing of code 24th January 2021

			INA219 Max Amps Expected settings					
Shunt	Shunt				Theoretical	Real		
Ohms	Micro Ohms	Does not work	Works okay	Max Amps		Max Amps Setting		
		Setting too low	note: integer			Minimum	Max	
0.1	100000	0	1	3.2		1	4	when Shunt Volts is 320mV Amps is 3.2 Amps
0.01	10000	2	3	32		3	32	when Shunt Volts is 320mV Amps is 32 Amps
0.001	1000	20	21	320		21	320	when Shunt Volts is 320mV Amps is 320 Amps
0.0001	100	204	205	3200		205	1000	when Shunt Volts is 100mV Amps is 1000 Amps

The programmable gain in the INA219 means that setting the MaxAmps to the lowest value required can improve the resolution
But it is important that MaxAmps remains above the minimum settings listed in the table above

For example when Shunt Micro Ohms is set to 100, it is important to set Max Expected Amps to at least 205Amps
(if not the calculation of Amps and power will go very wrong)

NOTE:- Key issue is that "calibration" variable in INA.cpp is a 16bit variable and hence overflows when MaxAmps * Rshunt = 40960/65536*32767
ie when Rshunt is 100 microOhms, MaxAmps must be greater than 204.8 therefore it should be set it to at least 205

			INA226 Max Amps Expected settings			
Shunt	Shunt			Max shunt	Real	Setting
Ohms	Micro Ohms			Voltage mV	Max	for
					Amps	MaxAmps
0.1	100000			81.92	0.8192	1
0.01	10000			81.92	8.1920	10
0.001	1000			81.92	81.9200	100
0.0001	100			81.92	819.2000	1000

Max Shunt voltage across IN+ & IN- on the INA226 is + or - 81.92 mVolts
There is no programmable gain amplifier in the INA226 so it does not help to reduce the MaxAmps setting
Note that it is possible to set the MaxAmps to a lower number ie 100 Amps or 300 Amps when Shunt Micro Ohms is 100
and it will still work fine, but the Amps output will not go above the MaxAmps setting

Shunt Ohms	Shunt Micro Ohms		INA3221 Max Amps Expected settings		
			Max shunt Voltage mV	Real Max Amps	Setting for MaxAmps
0.1	100000		163.8	1.638	2
0.01	10000		163.8	16.380	20
0.001	1000		163.8	163.800	200
0.0001	100		163.8	1638.000	2000

There is not a Current register in the INA3221 so Current is a calculated figure in the program

Max Shunt voltage across IN+ & IN- on the INA226 is + or - 163.8 mVolts