

# HF500 – Thermal Characteristic



The nominal resistance of HF series shunts is within 0.1% of the specified value as defined in the product brochure.

For HF100, 200 and 500 models, compliance with this specification is confirmed by voltage ratio calibration against a reference shunt. The current value at which calibration is carried out is appropriate for validation of the manufacturing process, from which compliance to the shunt specification over its complete operating range is assured by design.

Given the high current rating of an HF500 shunt and the associated increase in operating temperature at full working current, consideration of a thermal characteristic should also be taken into account when considering absolute accuracy under varying load conditions.

## Thermal Characteristic.

The HF500 shunt incorporates five circuit boards, each carrying up to 100Arms continuous current. These boards are immersed in potting compound that provides mechanical strength, electrical isolation and thermal conduction.

Optimum shunt performance is achieved when the HF500 heatsink fins have reached full working temperature and can then maintain the shunt temperature within design tolerance.

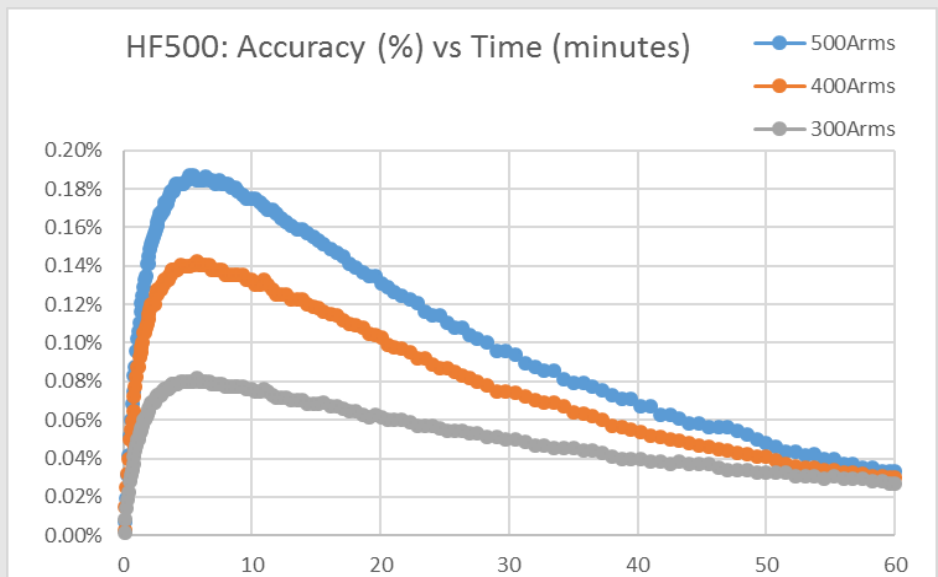
In the time period before working temperature is achieved, increased error will apply when continuous current above 300Arms is applied.

Here we illustrate an error profile with 300, 400 and 500Arms continuous current for 1 hour from an ambient temperature start.

400A continuous current reaches 0.1% accuracy within 20 minutes and remains within 0.15% during this time.

500A continuous current reaches 0.1% accuracy within 30 minutes and remains within 0.2% during this time.

This profile applies equally to DC current, AC current or the equivalent RMS current of a varying duty cycle load.



## Summary

The nominal accuracy of HF500 shunts remains within 0.1% up to 300Arms with no warm up time and also at current up to the full rated value after a warm up time as defined here.

During a warm up and stabilisation period, the nominal thermal characteristic is as follows:

Error	300Arms	400Arms	500Arms
min	0.00%	0.00%	0.00%
mean	0.05%	0.09%	0.10%
max	0.08%	0.14%	0.19%

Note: This data assumes an ambient temperature between 5-30°C and unobstructed convection cooling of the shunt