HF 1A/3/6/10A/20/100/200/500

High frequency Current Shunts

Description

The HF series current shunts are reliable and accurate current sensing devices designed to maintain a known impedance value over a wide frequency range.

Utilising an innovative circuit design unique to N4L, the HF series does not exhibit the change in total impedance or the phase error that is commonly associated with conventional resistive shunt designs.

While the design incorporates quite a large number of components, it is a passive device and does not require external power. All shunts are tested during manufacture to confirm that they are within their specified tolerance and are then potted to improve heat dissipation and increase mechanical strength.

The design will withstand overcurrent up to the specified crest factor and provided that they are operated within their specified rms current range, the impedance will remain within the specified tolerance with no need for calibration.
IMPORTANT SAFETY INSTRUCTIONS

The HF series shunts are designed for use in a high voltage, high current environment by suitably trained personnel - **observe the following precautions:**

- Ensure that all power is off when making connections to the HF shunt.

- The HF series are passive resistance shunts and it is important to remember that they **do not provide isolation from the circuit to which they are connected.**

  **If the output BNC is connected to a ground point, line current will flow through the sense circuit causing irreparable damage to the shunt.**

- The sense output connector complies with 600V Cat II isolation rating and safe connection to a measurement device requires the use of a touch proof BNC cable with equivalent connectors to those used on the cable supplied with each shunt.

- Connect the sense output only to an instrument with an isolated input rated for the voltage of the main current line.

- Ensure adequate ventilation and airflow to prevent excessive temperature rise of the shunt. If the shunt is used in an enclosed environment then forced ventilation may be required.

- Do not operate under conditions where condensation may occur.

- There are no user serviceable parts inside the HF series shunts – **do not attempt to open the case,** refer service to the manufacturer or his appointed agent.

**Note: Newtons4th Ltd. shall not be liable for any consequential damages, losses, costs or expenses arising from the use or misuse of this product however caused.**
**Warranty**

This product is guaranteed to be free from defects in materials and workmanship for a period of 36 months from the date of purchase.

In the unlikely event of any problem within this guarantee period, first contact Newtons4th Ltd. or your local representative, to give a description of the problem. If the problem cannot be resolved directly then you will be given an RMA number and asked to return the unit. The unit will be repaired or replaced at the sole discretion of Newtons4th Ltd.

This guarantee is limited to the cost of the HF Shunt itself and does not extend to any consequential damage or losses whatsoever including, but not limited to, any loss of earnings arising from a failure of the product.

In the event of any problem with the equipment outside of the guarantee period, Newtons4th Ltd. offers a full repair service – contact your local representative.

The HF Series shunts do not require any calibration.

**Declaration of Conformity**

We, Newtons4th Ltd, declare that the products HF010, HF100 and HF470 conform to the requirements of Council Directives:

- 89/336/EEC relating to electromagnetic compatibility: EN 55022 Class A
- 73/23/EEC relating to safety of laboratory equipment: EN 61010-1

November 2005

Eur Ing Allan Winsor BSc CEng MIEE
(Director of Newtons4th Ltd)
**Unpacking**

Inside the box there should be the following items:

- One HF series shunt
- One 2M BNC to BNC safety cable
- This User Guide

**Specification**

<table>
<thead>
<tr>
<th>Model</th>
<th>Nominal Resistance</th>
<th>Phase Error</th>
<th>Continuous Current</th>
<th>PPA typical* min Current</th>
</tr>
</thead>
<tbody>
<tr>
<td>HF500</td>
<td>0.2mΩ ± 0.1%</td>
<td>0.1° / kHz</td>
<td>500A rms</td>
<td>0.5A rms</td>
</tr>
<tr>
<td>HF200</td>
<td>0.5mΩ ± 0.1%</td>
<td>0.1° / kHz</td>
<td>200A rms</td>
<td>0.2A rms</td>
</tr>
<tr>
<td>HF100</td>
<td>1mΩ ± 0.1%</td>
<td>0.05° / kHz</td>
<td>100A rms</td>
<td>0.1A rms</td>
</tr>
<tr>
<td>HF020</td>
<td>10mΩ ± 0.1%</td>
<td>0.01° / kHz</td>
<td>20A rms</td>
<td>10mA rms</td>
</tr>
<tr>
<td>HF006</td>
<td>100mΩ ± 0.1%</td>
<td>0.002° / kHz</td>
<td>6A rms</td>
<td>1mA rms</td>
</tr>
<tr>
<td>HF003</td>
<td>470mΩ ± 0.1%</td>
<td>0.001° / kHz</td>
<td>3A rms</td>
<td>200µA rms</td>
</tr>
<tr>
<td>HF01A</td>
<td>1Ω ± 0.1%</td>
<td>0.001° / kHz</td>
<td>1.5A rms</td>
<td>100µA rms</td>
</tr>
<tr>
<td>HF10A</td>
<td>10Ω ± 0.1%</td>
<td>0.001° / kHz</td>
<td>315mA rms</td>
<td>10µA rms</td>
</tr>
</tbody>
</table>

Frequency Range: DC to 1MHz

Permitted Crest Factor: 10  
(E.g. repetitive peak current for HF100 is 1000Apk)

Maximum peak current:  
Single peak current with ≤ 100uS duration is 2 x Apk  
(E.g. single peak current for HF100 is 2000Apk ≤ 100uS)

Minimum current:  
Based on use with a PPA analyzer ext. input & CF ≤ 3

Nominal inductance: < 1nH

Input connectors:  
HF01A/003/006/020: 4mm safety type  
HF100/200: M10 Bolt  
HF500: M16 Bolt and Lug

Output connector: Touch proof BNC

**Note:** LINE POTENTIAL DO NOT GROUND.

Protection rating of case: 600V Cat II,  
HF100/HF200 supplied with protective boot for M10 bolt