

MC²
AUDIO

HS Series

HiFi Reference Power Amplifiers

HS1400/HS800

Operating Instructions

MC²
AUDIO

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DECLARATION OF CONFORMITY

We, the manufacturer:

**MC² Audio,
Units 6-8 Kingsgate
Heathpark Industrial Estate
Honiton, Devon
England
EX14 1YG**

acknowledge our responsibility that the following products:

Kind of equipment: Audio amplifier
Commodity Code: 8518408990
**Type Designation: T500, T1000, T1500, T2000, T3500, T4-250
Ti500, Ti1000, Ti1500, Ti2000, Ti3500, Ti4-250
E15, E25, E45, E90, E100, E475
S800, S1400, HS800, HS1400
and all OEM variants of these models**

are manufactured:

in accordance with EMC Directive 2004/108/EC,
in compliance with the following norm(s) or document(s):
Technical Regulations: EN55103-1:1996, EN55103-2:1996

and

in accordance with the Low Voltage Directive 2006/95/EC,
in compliance with the following norm(s) or document(s):
Technical Regulations: EN/IEC60065:2002 7th Edition

Signed:

Name: Alex Cooper
Position: Research and Development Manager
Date: July 2014

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THANKS

Thank you for choosing an HS Series amplifier for your application. Please spend a little time reading through this manual, so that you obtain the best possible performance from the unit and become familiar with its operating requirements.

All MC² products are carefully designed and engineered for cutting-edge performance and world-class reliability. If you would like further information about this or any other MC² product, please contact us.

We wish you many years of service from this amplifier and look forward to hearing from you in the near future.



INTRODUCTION

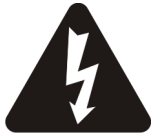
Designed for use in the best studio monitoring environment, but equally at home in any application where transparency and “no compromise” performance are the focus, the HS Series amplifiers deliver the sound quality and reliability expected from MC².

These amplifiers utilise the best complimentary AB bipolar output stages, combined with the unique MC² current driven floating drive stage along with analogue level controls for minimal signal degradation.

Sophisticated “side-chain” limiters prevent distortion and speaker damage, but are out-of-circuit until the onset of clipping so do not compromise the signal path under normal working conditions. A bespoke high fidelity shielded toroidal power supply combined with intelligent low noise fan control provide optimum conditions for the output stages, ensuring the only thing you will ever hear is your sound.

Critical parts have been selected through a series of listening tests for optimum sonic performance and approved by some of the most well respected personnel in the industry. The amplifiers of course include full DC, thermal and short circuit protection to ensure trouble-free service.

IMPORTANT SAFETY INSTRUCTIONS

CAUTION: RISK OF ELECTRIC SHOCK.
DO NOT OPEN

The lightning flash with arrowhead symbol within an equilateral triangle is intended to alert the user to the presence of uninsulated "dangerous voltage" within the product's enclosure that may be of sufficient magnitude to constitute a risk of electric shock to persons.



The exclamation point within an equilateral triangle is intended to alert the user of important operating and maintenance (servicing) instructions in the literature accompanying the appliance.

WARNING: Apparatus with CLASS I construction shall be connected to a MAINS socket outlet with a protective earthing connection.

WARNING: To prevent injury, this apparatus must be securely attached to the rack in accordance with the installation instructions.

Read these instructions.

Keep these instructions.

Heed all warnings.

Follow all instructions.

Do not use this apparatus near water.

Clean only with a dry cloth.

Do not block any ventilation openings, install in accordance with the manufacturer's instructions.

Do not install near any heat sources, such as radiators, heat registers, stoves or other apparatus (including amplifiers) that produce heat.

Protect the power cord from being walked on or pinched particularly at plugs, convenience receptacles and the point where they exit from the apparatus.

The mains circuit breaker shall remain readily accessible.

Only use attachments/accessories specified by the manufacturer.

Use only with the cart, tripod, bracket or table specified by the manufacturer, or sold with the apparatus. When a cart is used, use caution when moving the cart/apparatus combination to avoid injury from a tip over.

Disconnect this apparatus during lightning storms or when unused for a long period of time.

Refer all servicing to qualified service personnel. Servicing is required when the apparatus has been damaged in any way, such as if the power-supply cord or plug is damaged, liquid has been spilled or objects have fallen into the apparatus, the apparatus has been exposed to rain or moisture, does not operate normally, or has been dropped.

Do not expose this equipment to dripping or splashing and ensure that no objects filled with liquids, such as vases, are placed on the equipment.

To completely disconnect this equipment from the AC mains, disconnect the power cord from the mains circuit breaker.

Where the amplifier is mounted in a rack and permanently connected to the mains, then the rack should be installed with a readily accessible connector or an ALL POLE circuit breaker with 3mm breaking distances.

This unit is fitted with a 3-wire power cord. For safety reasons, THE EARTH LEAD SHOULD NOT BE DISCONNECTED IN ANY CIRCUMSTANCE.

The cooling fans suck cool air in through the front and blow hot air out at the rear of the unit through the ventilating grills. The front and rear of the amplifier should have free exposure to the air (i.e. in a rack leave the front and rear doors off), with 2cm air gap at the sides and top. IF AIR IS NOT ALLOWED TO ESCAPE FROM THE REAR, OVER-HEATING WILL OCCUR. Take care when mounting other equipment in the same rack.

The mains switch on the amplifiers only switches one pole of the mains supply, therefore for units with a detachable cord to be fully disconnected from the mains, the mains disconnect device (ie mains plug or mains coupler) should remain readily operable. For units with a fixed mains lead the external all pole circuit breaker with 3mm breaking distances is the disconnect device and therefore the installation of the amplifier shall be carried out in accordance with all the applicable installation rules.

INSTRUCTIONS DE SECURITE IMPORTANTES



ATTENTION: RISQUE DE CHOC ELECTRIQUE. NE PAS OUVRIR



Le symbole représentant un éclair fléché dans un triangle équilatéral a pour but d'alerter l'utilisateur de la présence d'une "tension dangereuse" non isolée à l'intérieur du boîtier, pouvant être d'une force suffisante pour constituer un risque d'électrocution.



Le point d'exclamation dans un triangle équilatéral a pour but d'alerter l'utilisateur de la présence d'instructions importantes concernant le fonctionnement et la maintenance, dans la documentation qui accompagne l'appareil.

ATTENTION: Appareils de construction de CLASSE I doit être raccordé au réseau électrique via une prise de courant reliée à la terre.

ATTENTION: Pour éviter toute blessure, cet appareil doit être solidement fixé à la torture, conformément aux instructions d'installation.

Lisez ces instructions.

Gardez ces instructions.

Faites attention à tous les avertissements.

Suivez toutes les instructions.

N'utilisez pas cet appareil près de l'eau.

Faites le ménage seulement avec un tissu sec.

Ne bloquez pas d'ouvertures de ventilation, installez conformément aux instructions du fabricant.

N'installez près d'aucunes sources de chaleur, comme les radiateurs, les registres de chaleur, les cuisinières ou d'autre appareil (en incluant des amplificateurs) qui produisent la chaleur.

Protégez la corde de pouvoir d'être marché sur ou pincé particulièrement aux prises de courant, les réceptacles d'avantage et la pinte où ils sortent de l'appareil.

Le disjoncteur de conduite principale restera sans hésiter accessible.

Utilisez seulement des attachements/accessoires spécifiés par le fabricant.

Utilisez seulement avec le chariot, le trépied, la parenthèse ou la table spécifiée par le fabricant, ou vendu avec l'appareil. Quand un chariot est utilisé, utilisez la prudence en déplaçant la combinaison de chariot/appareil pour éviter la blessure d'un bout.

Débranchez cet appareil pendant les tempêtes de foudre ou quand neuf pendant un long terme de temps.

Renvoyez tout l'entretien au personnel de service qualifié. L'entretien est exigé quand l'appareil a été nui de toute façon, comme si la corde de pouvoir provision ou la prise de courant sont nuis, le liquide a été déversé ou les objets sont tombés dans l'appareil,

l'appareil a été exposé pour pleuvoir ou l'humidité, n'opère pas normalement, ou a été baissé.

N'exposez pas cet équipement au fait de tomber goutte à goutte ou au fait d'éclabousser et garantissez qu'aucun objet rempli des liquides, comme les vases, n'est placé sur l'équipement.

Pour complètement débrancher cet équipement de la conduite principale de courant alternatif, débranchez la corde de pouvoir du disjoncteur de conduite principale.

Où l'amplificateur est monté dans un égouttoir et en permanence raccordé à la conduite principale, alors l'égouttoir devrait être installé avec un connecteur sans hésiter accessible ou TOUT le disjoncteur de PÔLE avec 3 millimètres cassant des distances.

Cette unité est correspondue avec une corde de pouvoir de 3 fils. Pour les raisons de sécurité, L'AVANCE DE TERRE NE DEVRAIT ÊTRE DÉBRANCHÉE DANS AUCUNE CIRCONSTANCE.

Les ventilateurs englobent l'air frais par le front et soufflent l'air chaud à l'arrière de l'unité par les grils aérants. Le front et l'arrière de l'amplificateur devraient avoir l'exposition libre à l'air (c'est-à-dire dans un égouttoir omettent les portes de devant et arrière), avec le trou aérien de 2 centimètres aux côtés et au haut. Si on NE PERMET PAS QUE D'AIR S'ÉCHAPPE DE L'ARRIÈRE, LE FAIT DE SURCHAUFFER SE PRODUIRA. Faites attention en montant d'autre équipement dans le même égouttoir.

L'interrupteur principal sur les amplificateurs ne coupe qu'un pôle de l'alimentation secteur. le cordon IEC permettra de déconnecter l'appareil de l'alimentation secteur, pour cette raison l'accès à ces fiches (fiche mâle ou femelle) doit être facilités.

Pour les appareils avec un câble d'alimentation fixe sans fiche secteur, le dispositif de coupure omnipolaire ayant une distance d'ouverture de contact d'au moins 3mm, sera le dispositif permettant la déconnexion complète de l'appareil.

Pour cette raison l'installation et le raccordement de l'amplificateur devra ce faire conformément au réglementation en vigueur.

Installing Your Amplifier: Electrical Considerations

The amplifier has been manufactured to comply with your local power supply requirements, but before connecting the unit to the supply, ensure that the voltage (printed on the rear panel) is correct.

The amplifier is fitted with either a 100/120V or 220/240V tapped transformer according to customer requirements.

Make sure power outlets conform to the power requirements listed on the back of the unit. Damage caused by connecting to improper AC voltage is not covered by the warranty.

SAFETY WARNING

Where a MAINS plug or appliance coupler is used as the disconnect device, it should remain readily operable.

Where the amplifier is mounted in a rack and permanently connected to the mains, then the rack should be installed with a readily accessible connector or an ALL POLE circuit breaker with 3mm breaking distances.

This unit is fitted with a 3-wire power cord.

For safety reasons,

THE EARTH LEAD SHOULD NOT BE DISCONNECTED IN ANY CIRCUMSTANCE.

If ground loops are encountered consult the section on connecting your amplifier on page 10.

The wiring colours are:

230V AREAS: EARTH = GREEN AND YELLOW
NEUTRAL = BLUE
LIVE = BROWN

120V AREAS: EARTH = GREEN
NEUTRAL = WHITE
LIVE = BLACK

DO NOT USE THE UNIT IF THE ELECTRICAL POWER CORD IS FRAYED OR BROKEN. The power supply cords should be routed so that they are not likely to be walked on or pinched by items placed upon or against them, paying particular attention to cords and plugs and the point where they exit from the appliance.

ALWAYS OPERATE THE UNIT WITH THE AC GROUND WIRE CONNECTED TO THE ELECTRICAL SYSTEM GROUND. Precautions should be taken so that the means of grounding of a piece of equipment is not defeated.

DO NOT REMOVE THE LID. Removing the lid will expose you to potentially dangerous voltages. There are no user serviceable parts inside.

Installing Your Amplifier: Mechanical Considerations

To ensure that this equipment performs to specification, it should be mounted in a suitable rack or enclosure as described below. Like all high power amplifiers, it should be kept away from other equipment which is sensitive to magnetic fields. Also, this amplifier may suffer a substantial reduction in performance if it is subjected to, or mounted close to equipment which radiates high RF fields.

Warning: To prevent injury, this apparatus must be securely attached to the rack in accordance with the installation instructions

When mounting the amplifier in a rack or enclosure:

Be aware that...

THE FRONT PANEL IS NOT CAPABLE OF SUPPORTING THE UNIT ON ITS OWN.

Make sure that the rear of the unit is adequately supported. The brackets which are supplied fit standard 19 inch (483mm) rack mounting systems.

ENSURE THERE IS ADEQUATE VENTILATION.

The cooling fans suck cool air in through the front and blow hot air out at the rear of the unit through the ventilating grills. The front and rear of the amplifier should have free exposure to the air (i.e. in a rack leave the front & rear doors off), with 2cm air gap at the sides.

IF AIR IS NOT ALLOWED TO ESCAPE FROM THE REAR, OVER-HEATING WILL OCCUR.

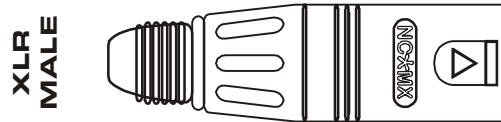
Take care when mounting other equipment in the same rack.

Make sure that the rack unit has a separate earth connection (technical earth).

Please also see the notes regarding maintenance on page 15.

Connecting To Your Amplifier: Inputs and Link Outs

Inputs and Links - The input and link outputs are made via 3-pin XLR connectors, which are electronically balanced and should be connected via a high grade twin core screened cable, as follows:



PIN1: Screen (see note)
 PIN2: Hot (signal +)
 PIN3: Cold (signal -)

The amplifier is designed to operate with fully balanced equipment and ground loops or loss of performance may be experienced if connected to unbalanced sources. If it is unavoidable however, the following wiring should be used. The cable should still be twin core plus screen.

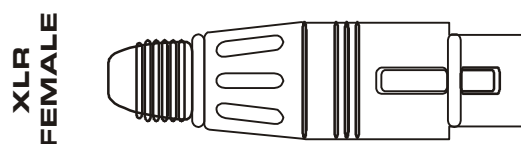
PIN1: Screen - connected to the chassis of the unbalanced equipment - or left disconnected at the unbalanced end.
 PIN2: Hot (signal +)
 PIN3: Cold (ground 0V)

NOTE: This amplifier is wired to the latest industry recommendations. PIN1 is connected directly to the chassis/mains earth. If ground loops (mains hum) are encountered remove the screen connection from the other end of the cable and leave it open circuit. If problems persist, consult your dealer/supplier.

DO NOT TAMPER WITH OR ALTER ANY GROUND (EARTH) CONNECTIONS INSIDE THE AMPLIFIER.

For bridged operation input should be made to channel A only and the rear panel switch set for bridged mode.

For link outputs the following wiring should be used:



PIN1: Screen (see note)
 PIN2: Hot (signal +)
 PIN3: Cold (signal -)

Note that link outputs are purely passive and are hardwired across the inputs, so will continue to function even if the amplifier is turned off.

Connecting To Your Amplifier: Speaker Outputs

The speaker outputs are via binding posts which are also capable of taking 4mm banana plugs. Always use cable capable of handling the currents of the amplifier. Thin cables will not only result in power loss and audio quality degradation, but could cause a fire risk

There must be no shared connections between channels.

As the currents involved are very high, and to ensure best performance, the speaker cables should be kept as short as possible and conform to the following minimum requirements:

HS800, 12A into 4 Ohm speaker loads
HS1400, 16A into 4 Ohm speaker loads

Do not connect the inputs/outputs to any other voltage source such as a battery, mains source or power supply, regardless of whether the amplifier is turned on or off.

Do not run the output of any amplifier channel back into another channel's input and do not parallel or series-connect an amplifier output with any other amplifier output.

Connecting To Your Amplifier: Bridged (Mono) Operation

Although bridged mode is possible (into 8 ohm loads or greater) it is not recommended due to the inherent quality reduction associated with bridged use of any amplifier.

Supply signal to Channel A input only and push in the rear panel switch marked "Bridged Mono".

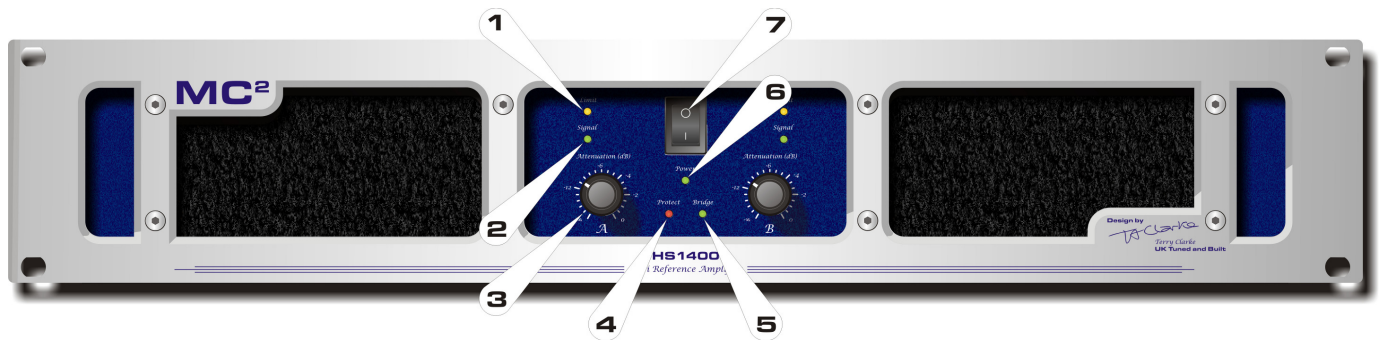
Use channel B +ve output and channel A -ve output terminals, and connect as follows:

Ch. B +: Hot
Ch. A -: Cold

When operating in bridged mode, the minimum impedances are doubled.

The minimum load in bridged mode is 8 Ohms.

Operating Your Amplifier: Front Panel Controls and Indicators



1: Limit LEDs: The amplifiers incorporate signal limiters, which are preset to prevent clipping with high levels of drive. The amber LEDs on the front panel illuminate to indicate operation of the limiters.

2: Signal LEDs: These are active from a minimum output level of approximately 10 Watts and are an indication only of signal presence.

3: Attenuation Controls: These are analogue controls allowing precise level settings. Note that in 'BRIDGED' mode only 'channel A' control is active.

4: Protect LED: If the outputs are shorted or if DC is present, the protection circuit will disengage the outputs and the Protect LED will illuminate. The amplifier will continue to be monitored and depending on the type of fault, will either reset after the fault has cleared or require manual resetting by switching off at the mains switch and then on again after a few seconds.

Temperature related faults will reset if the unit has cooled sufficiently.

Output short circuits will require manual reset after clearing the fault.

5: Bridge LED: This indicates the position of the switch on the rear panel and is illuminated when bridged mode is selected with the switch pressed in.

6: Power LED: This indicates when the amplifier is active – this does NOT indicate the presence of a mains supply when the power switch is OFF.

7: Power Switch: This single pole switch turns the amplifier fully off (but does not isolate it from the mains supply).

Operating Your Amplifier: Notes and Switching On

Read all documentation before operating your equipment and retain all documentation for future reference.

Do not spill water or other liquids into or on the unit and do not operate the unit while standing in liquid.

Do not block fan intake or rear ventilation outlets or operate the unit in an environment that could impede the free flow of air around the unit.

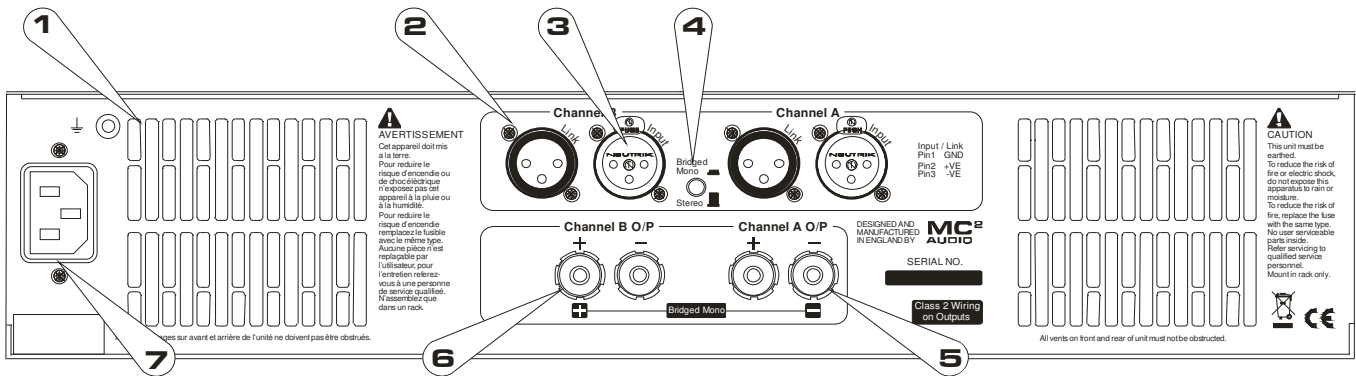
If the unit is used in an extremely dusty or smoky environment, it should be cleaned of any collected debris at regular intervals. Please also see the notes regarding maintenance on page 15.

It is important that the power output of your amplifier is matched to the power handling capacity of your loudspeaker. If not, damage to the loudspeaker could occur.

Switching On...

At 'switch-on' the protection circuit will initially activate whilst the circuits stabilise. Assuming no faults are detected after a few seconds only the Power LED (and Signal indicators if signal is applied) will illuminate.

Operating Your Amplifier: Rear Panel Sockets and Switches



1: Fan outlets: The variable speed fans suck air in through the front vents and out through the back of the amplifier. Please see maintenance on page 15 for recommendations on how to clean these and the front foam sections.

2: Link out XLR sockets: These are passively connected directly to their respective inputs to allow for parallel input connections to other amplifiers. As such, they will function even if the amplifier is turned off.

3: Input XLR sockets: Connect signal inputs to these sockets, wired pin 2 hot, 3 cold, 1 ground. For sensitivity and impedance of these inputs, please see the specifications on page 16. When running in bridged (mono) mode, only input A is used.

4: Bridged (Mono) switch: Depress this switch to run the amplifier in bridged mode. Note that the output must be taken from channel B and channel A's binding posts as marked on the rear panel.

5: Channel A output binding posts: Connect speaker with either bare wires or 4mm banana plugs. (Note that in bridged mode, the negative terminal only is used for the "cold" side of the load. No connection is made to the positive terminal in bridged mode.)

6: Channel B output binding posts: Connect speaker with either bare wires or 4mm banana plugs. (Note that in bridged mode, the positive terminal only is used for the "hot" side of the load. No connection is made to the negative terminal in bridged mode.)

7: Mains inlet: Connect a suitably rated 3 core IEC mains cable.

Looking After Your Amplifier: Maintenance

These maintenance instructions are for use by qualified personnel only. Before any routine maintenance, please ensure that your amplifier is disconnected from the mains supply!

The filter behind the air intake apertures on the front of your amplifier should be cleaned or replaced periodically, e.g. 3 -6 months. (Filters in amplifiers located in more 'dirty' atmospheres may require more frequent maintenance).

The filter should be 'dry' cleaned, using a vacuum cleaner preferably. Running the unit without a filter is not recommended. We recommend replacement of filters every 2-3 years, depending on usage. Replacement filter material is available directly from us.

If the fan vents on the rear of the amplifier develop a build-up of dust/debris on the finger guards, they can be cleaned with a dry paintbrush and a vacuum cleaner.

The casework of the amplifier may be cleaned with a lightly dampened cloth – do not use any solvents as they will damage the paint finish and could remove printing.

If you have any doubts about carrying out maintenance, please refer to a service engineer or contact your local dealer.

Looking After Your Amplifier: Warranty

Your amplifier is guaranteed for a period of five (5) years from the date of manufacture. Please note that this does not apply to OEM versions of the amplifier – please consult your manufacturer for their warranty terms. We hope that it gives you many more years of reliable service than this, but should anything go wrong, please contact us to advise you about repairs or any spares you might require.

Please do not attempt to repair the amplifier yourself as doing so will invalidate the warranty.

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email: sales@mc2-audio.co.uk for general enquiries

Our website is a great place to get started if you have any questions regarding the general use of your amplifier or need copies of this manual in digital form, or datasheets and photographs. The datasheets also contain architect's and engineer's specifications.

www.mc2-audio.co.uk

Performance Of Your Amplifier: Specifications

Main Specifications

| Parameter (Units) | HS1400 | HS800 |
|---|-----------------|-----------------|
| Output Power per channel [Crest Factor = 4.8] (Watts) | | |
| 8 Ohms | 775 | 475 |
| 4 Ohms | 1500 | 950 |
| Output Power per channel bridged [Crest Factor = 4.8] (Watts) | | |
| 8 Ohms | 3000 | 1900 |
| THD+N, 4 Ohms (%) | | |
| @1kHz, 1dB below max output power < | 0.008 | 0.007 |
| @20Hz - 20kHz, 1dB below max output power < | 0.03 | 0.03 |
| Gain Options (dB) | 32 / 36 | 32 / 36 |
| Sensitivity Options for max power (dBu) | 8.0 / 4.0 | 5.5 / 1.5 |
| Sensitivity Options for max power (Volts) | 2.0 / 1.2 | 1.4 / 0.9 |
| Frequency Response, +0/0.5dB (Hz) | 20 – 20000 | 20 – 20000 |
| Power Consumption, Nominal @ 240V, 4 Ohms (A) | 3.2 | 2.1 |
| Power Consumption, Nominal @ 120V, 4 Ohms (A) | 6.4 | 4.2 |
| Dimensions H x W x D (mm) | | |
| Amplifier | 88 x 482 x 428 | 88 x 482 x 428 |
| Boxed | 230 x 580 x 560 | 230 x 580 x 560 |
| Boxed Shipping – all except UK | 250 x 610 x 600 | 250 x 610 x 600 |
| Weight (kgs) | | |
| Amplifier | 23.25 | 20.5 |
| Boxed – shipping | 25 | 22.25 |

Additional Specifications

| Parameter (Units) | HS1400 | HS800 |
|--|--------|-------|
| Input Impedance – Active Balanced (Ohms) | 20k | 20k |
| Input CMRR (dB) | > 60 | > 60 |
| SNR (dB) | 106 | 106 |
| Damping Factor, 1kHz, 8 ohms | > 400 | > 400 |
| Signal Limiters Present | Yes | Yes |
| Protection Present – Short Circuit / DC Output / Temperature | Yes | Yes |
| Mains In-rush Control Present | Yes | Yes |
| Output Power per channel, 8 Ohms (Watts) | | |
| Sine Wave @ 1kHz | 650 | 450 |
| Continuous music [Crest Factor of 2.8 or 9dB] | 725 | 475 |
| Continuous music [Crest Factor of 4.8 or 14dB] | 775 | 475 |
| Continuous music [Crest Factor of 7.8 or 18dB] | 775 | 500 |
| Output Power per channel, 4 Ohms (Watts) | | |
| Sine Wave @ 1kHz | 1250 | 800 |
| Continuous music [Crest Factor of 2.8 or 9dB] | 1450 | 900 |
| Continuous music [Crest Factor of 4.8 or 14dB] | 1500 | 950 |
| Continuous music [Crest Factor of 7.8 or 18dB] | 1500 | 1000 |

Due to continuing product improvement the above specifications are subject to change.

*Power output is automatically limited to this value on the HS1400 model.

Performance Of Your Amplifier: Specifications

Power Consumption and Thermal Emissions – HS1400

| Mains (V) | Load (R) | Current Draw (A) | | | | Thermal Emissions (W) | | | |
|------------|----------|------------------|-------|---------|-------|-----------------------|-------|---------|-------|
| | | No Sig'l | Light | Average | Heavy | No Sig'l | Light | Average | Heavy |
| 240 | 8 | 0.6 | 1.1 | 1.9 | 4.0 | 144 | 173 | 223 | 343 |
| 240 | 4 | 0.6 | 1.5 | 3.2 | 7.3 | 144 | 200 | 296 | 543 |
| 120 | 8 | 1.2 | 2.2 | 3.8 | 7.9 | 144 | 173 | 223 | 343 |
| 120 | 4 | 1.2 | 3.1 | 6.4 | 14.6 | 144 | 200 | 296 | 543 |

Power Consumption and Thermal Emissions – HS800

| Mains (V) | Load (R) | Current Draw (A) | | | | Thermal Emissions (W) | | | |
|------------|----------|------------------|-------|---------|-------|-----------------------|-------|---------|-------|
| | | No Sig'l | Light | Average | Heavy | No Sig'l | Light | Average | Heavy |
| 240 | 8 | 0.5 | 0.8 | 1.3 | 2.7 | 120 | 139 | 168 | 251 |
| 240 | 4 | 0.5 | 1.1 | 2.1 | 4.7 | 120 | 157 | 216 | 368 |
| 120 | 8 | 1.0 | 1.6 | 2.6 | 5.4 | 120 | 139 | 168 | 251 |
| 120 | 4 | 1.0 | 2.2 | 4.2 | 9.3 | 120 | 157 | 216 | 368 |

No Sig'l = Quiescent, Light = Crest Factor of 7.8(18dB),

Average = Crest Factor of 4.8(14dB), Heavy = Crest Factor of 2.8(9dB)

For details of measurement methods please refer to the Technical Support area of our website.