



# ELECTROSONIC HUMIDIFICATION SYSTEMS

Using energy efficient,  
state of the art technology

## Description

### PRINCIPLE OF OPERATION

The Electrosonic humidifier employs state of the art technology in ultra-high frequency piezo-ceramics. The process creates a nebulisation of water into particles as small as 1 micron, allowing evaporation into the air to be achieved quickly and efficiently.

Electronic oscillator circuits are used to power the piezo-ceramic transducers at about 1.6MHz. The transducers are matched at their resonant frequency and produce a mechanical vibration.

In the Electrosonic humidifier, water is directly in contact with the vibrating faces of the transducers. This causes vibration to take place in the water. Because of its mass, the water is unable to follow the high frequency oscillation of the transducers and cavitation occurs. When this happens below the surface of the water, refracted capillary waves are generated, throwing off a dense cloud of water particles.

This technique used in the Electrosonic humidifier, opens up a new era for low energy, low maintenance humidification systems in all applications.

### ADVANTAGES OF ELECTROSONIC

#### • Low energy input

Compared to electrode boiler or infra-red type humidifiers, the Electrosonic humidifier requires up to 90% lower energy input.

#### • Adiabatic Cooling gives further energy savings

The evaporation effect of the nebulised water provides a cooling effect, allowing further energy savings in air conditioning plant.

#### • Minimises health and hygiene risks

Cold feed water is used in the Electrosonic humidifier and there is no recycling of water. Humidification therefore takes place outside of the range of temperatures where bacteria growth is expected and no water remains to stagnate. The medical grade stainless steel construction, with smooth inside surfaces, allows cleaning to take place quickly and easily and avoids the hygiene risks associated with dirty equipment.

#### • Engineered for industrial use

The Electrosonic humidifier has been designed to operate in the demanding environments of computer room and clean room air-conditioning. Medical grade 1.2mm thickness stainless steel is used in its construction and the electronic components have been selected for continuous 24 hours per day operation. Multiple electronic modules provide standby should failure of components occur and repair or replacement of all components can be quickly carried out.

#### • Low maintenance costs

The Electrosonic humidifier requires minimum maintenance. The use of demineralised water enhances this, since no scaling or blocking-up occurs.

#### • Fast response for flexible control

Full output from the humidifier is available instantly, so that a simple on/off humidistat can provide good control for most applications. In addition, a range of alternative control systems can be applied to the Electrosonic humidifiers. Both step controllers and fully modulating control systems can be supplied.

#### • Easy installation, even on existing systems

The Electrosonic humidifiers can be accommodated within most air-conditioning systems, either as original equipment or as an energy-saving retrofit unit. Self contained units are also available for humidification directly within the space.

#### • Silent operation

The Electrosonic humidifier is completely silent and can therefore be used in applications such as terminal ducts close to an occupied space. The self contained unit is provided with a slow running fan so that even the noise levels demanded by residential applications can be met.

### SUMMARY OF ENERGY SAVING POTENTIAL

Over 6000 hours per year of humidification are needed to maintain indoor conditions of 22°C 50% RH in UK weather conditions (estimate based on average Heathrow weather data).

This requirement is found in many computer and clean room applications, where continuous operation of air conditioning plant is demanded.

The ultra high frequency nebulisation process employed by the Electrosonic humidifier requires an energy input of approximately 55 Watts per kg/h of humidification. For the same humidification, an electrode boiler or infra-red type humidifier requires a minimum of 700 Watts (up to 1000 Watts when losses are included).

The additional adiabatic cooling effect from the Electrosonic humidifier provides 650 Watts per kg/h, which results in significant savings in energy and operating wear for the air conditioning system.

An analysis of the above conditions will show a potential for considerable energy savings. It is not unusual to see a payback period of 2 years or less when the Electrosonic humidifier is used to replace electrode or infra-red type humidifiers used in a computer room application.

# Applications and Technical Data

## MODEL RANGES ES

The ES Electrosonic models cover universal applications for use in either new or existing installations.

The ES model can be applied in any of the following configurations:

### • Duct mounted

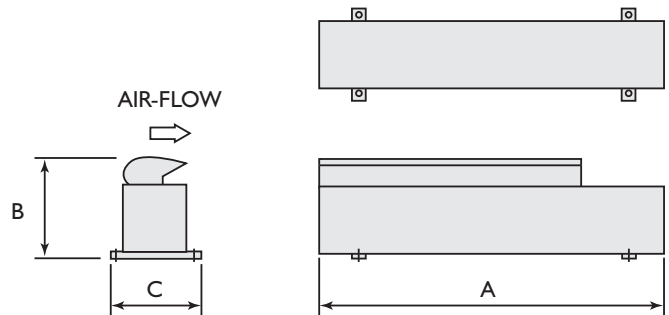
The Electrosonic unit would be positioned inside the duct, ensuring that air velocity does not exceed 3 m/s and that a minimum of a 500mm length downstream of this unit is allowed before any obstruction or change in section occurs.

### • Mounted in an Air Conditioning Unit

The ES model can be accommodated within most air conditioning units, even as a retrofit replacement. Both upflow and downflow computer room units can be equipped in this way. Mounting kits and application data for most well known makes of air conditioning units are available.

### • Supplied within central station air handling plant

Using the standard humidifier section supplied by most air handling unit manufacturers, the Electrosonic can be installed as original equipment, or easily retrofitted on site.



## TECHNICAL DATA FOR ELECTRONIC MODELS ES

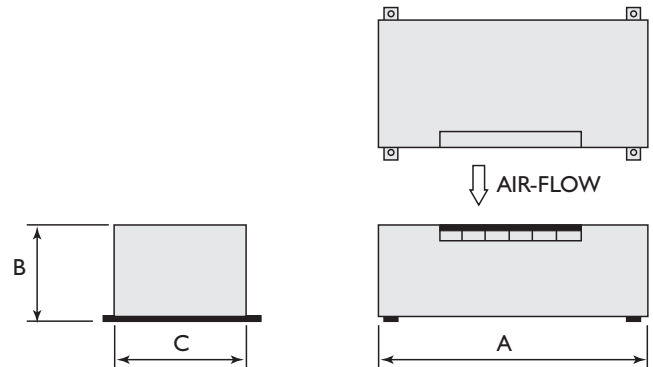
MODEL	NOMINAL CAPACITY kg/h	ELECTRICAL INPUT WATTS	LENGTH (mm) A	HEIGHT (mm) B	WIDTH (mm) C
ES2	1.5	70	305	196	160
ES4	2.5	140	425	196	160
ES6	4.0	210	545	196	160
ES8	5.0	280	665	196	160
ES10	6.5	350	785	196	160
ES12	8.0	420	905	196	160
ES14	9.0	490	1025	196	160
ES16	10.5	560	1145	196	160
ES18	12.0	630	1265	196	160
ES20	13.0	700	1385	196	160

ELECTRICAL SUPPLY TO UNIT: 240/50/1 TRANSFORMED TO 36-56 VOLTS VIA SEPARATELY MOUNTED TRANSFORMER

## MODEL RANGES ESHC, ESVC

The Electrosonic humidifier is available as a self contained unit which has a fan built-in. This allows mounting directly in the space to be humidified. This self contained range is covered by the model ESHC - horizontal cabinet design, for high level mounting applications and the model ESVC - vertical cabinet design, for wall mounting.

The built-in fan is designed to run at low speeds, ensuring low noise levels. Accessories available include BMS or stand alone control panels (500W x 500H x 210D), so that a completely packaged humidification system can be obtained.



## TECHNICAL DATA FOR ELECTRONIC MODELS ESHC (= HORIZONTAL CABINET) AND ESVC (= VERTICAL CABINET)

MODEL	NOMINAL CAPACITY kg/h	FAN AIR VOLUME l/s	ELECTRICAL INPUT WATTS	LENGTH (mm) A	HEIGHT (mm) B	WIDTH (mm) C
ESH2	1.5	80	120	650	230	300
ESH4	2.5	80	190	650	230	300
ESH6	4.0	80	260	650	230	300
ESH8	5.0	120	380	850	230	350
ESH10	6.5	120	450	850	230	350
ESV2	1.5	80	120	490	490	300
ESV4	2.5	80	190	490	490	300
ESV6	4.0	80	260	750	490	300
ESV8	5.0	120	380	750	490	300
ESV10	6.5	120	450	950	490	300

ELECTRICAL SUPPLY TO UNIT: 240/50/1 BUILT-IN TRANSFORMER PROVIDES 36-56 VOLTS TO ELECTRONIC GENERATOR CIRCUITS

# Specifications

- **General - applies to all models**

Casing construction from 1.2mm stainless steel grade EN 58J (AISI 316 S) with nuts, bolts and studding in stainless steel. Casing is designed for simple access to all components and for ease of cleaning. Water tank is provided with overflow pipe and drain pipe to allow complete draining of all water contained.

Supply of water is through a unit mounted solenoid valve and controlled by water level sensor. Second water level sensor controls power input to oscillator circuits to inhibit operation when water is not present. Printed circuit board with relays controls power from transformer (supplied separately for ES models) to oscillator circuits and provides safety interlocks for low water level and high water temperature.

Each oscillator circuit feeds one piezo-ceramic transducer and operates independently from other oscillators.

Supply transformer is sized for continuous operation at maximum humidifier output and is double wound. Primary supply is 240 volts, 50 Hz single phase and secondary tapings of 36, 40, 44, 48, 52, 56 volts are provided.

- **Models ESHC and ESVC**

Cabinets constructed from 1.2mm steel with powder coated paint finish. Units have built-in drain pans, power transformer, tangential flow fan, on/off switch.

- **Controls and accessories**

All units can operate from single stage humidistat. Two and four stage control systems available and fully modulating controls can be supplied. Auto drain system with timed drain down cycle available.

# Water Conditioning

Demineralised water only is recommended for use with Electrosonic humidification systems. This ensures that scale does not build up in system and that dust free humidification is achieved. transducer life is also enhanced when mineral salts are not present during cavitation process.

Regal Systems can provide suitable demineralisation systems, ranging from resin cartridges to reverse osmosis units. Please ask for advice on suitability of water supplies before applying Electronic humidifiers.



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