



## **EM/EMS Electronic Servo AC Stabilisers and Power Conditioners**

['EM/EMS' Range Brochure](#)



# » Introduction

## Watford Control

### » True World Leadership

World status is all too easy to claim, but Watford Control can offer the solid proof. Established in 1947 with the aim of tackling the post-war mains supply problems which became even more acute with the introduction of more sophisticated mains powered equipment. Ever since then we have specialised in AC Voltage Stabilisation and Power Conditioning, solving mains supply problems worldwide.

All mains powered devices require a supply which is maintained within certain limits. Thus a low supply voltage can cause malfunction, whilst a high supply voltage will cause serious damage. Micro-processor based and other sensitive equipment requires not only a stable voltage but a clean supply free of transient spikes and other electrical noise.

### Constant Innovation

» To meet the growing needs, we design and manufacture a constantly expanding range of AC Voltage Stabilisers and Power Conditioners. Under a forward-looking, innovative management we have constantly advanced the performance of our stabilisers keeping abreast of the latest developments in technology. Through all these years we have led the way with faster response, smoother surge-free operation and complete reliability. All of the design features built into today's products were developed by us, many covered by patents unique to Watford Control. These include, in addition to the EM/EMS Range described in this catalogue, Duoreg Low Cost Stabilisers, BE Solid-State Stabilisers and Powersaver Converters.

### In-House Design and Manufacture

» When you order voltage protection from us, it comes with all this unique experience and unlike some suppliers, our entire development programme has been in-house, every technological advance from our own design department, every new product from our own production lines. All manufactured under strict quality controlled procedures.



Small wonder that we confidently claim to have built far more AC Voltage Stabilisers within our range than anyone else in the UK, and sold them worldwide. There are hundreds of thousands of Watford Control units now in service, in some of the toughest environments on earth.

## ▶ Corby - The Source

You can see even more evidence of world leadership by visiting our modern factory in Corby, England. Here you can see the production lines where all our ranges are built. Lines with the capacity to meet major orders from world customers.

In the metal shop the rugged stabiliser cases and enclosures are fabricated to exacting standards using modern computer controlled equipment. Then you might be surprised to find all the transformers for our stabilisers being produced in our own winding shop.

The only way we can be sure these vital components meet our rigorous standards is to make them ourselves.

## ▶ Quality Control

More impressive still are the quality control procedures. Every completed stabiliser is given a thorough inspection and a full load performance check, then placed on a 24 hour soak test before facing inspection for a second time. No product goes to its customer until we are certain it fully meets its specification. Even the despatch operation tells something of the Watford Control philosophy. You will see units bound for overseas markets being first wrapped, then crated to ensure they arrive in perfect condition.

Needless to say, our quality management system has been assessed and approved to ISO9001, and all our products are manufactured to the relevant British Standards and their international equivalents.

The drawing office and design department is where you can see our constant development and improvement policy in action. But more than that, the expertise that created these stabiliser ranges can be called on to plan any special requirements you may have. While companies without such resources may be reluctant, we actually welcome your specials, and with such a vast range of standard models and options to draw on, we can meet your needs with minimum bother and expense.



# EM/EMS Electronic Servo Range

With 6,000 catalogued models to choose from

## ► Cost-effective

The EM/EMS range from Watford Control, offers the most cost-effective and efficient way to ensure a stable, undistorted mains supply for the vast majority of applications. Through a continuous development programme, today's EM/EMS range combines the well tried and dependable electronic-servo principle with many unique, performance-enhancing features. And above all, with hundreds of thousands of units already in service worldwide, you need have no doubt about the hard-working reliability built into every stabiliser.

## ► A well-tried principle

At the heart of an EM/EMS stabiliser, a transformer has its secondary winding connected between the mains supply and the load, with the primary winding voltage controlled by a motor driven variable transformer. A solid state servo amplifier continuously monitors the output voltage of the stabiliser, and any error voltage is amplified to operate the servo motor of the variable transformer, driving its brushgear to a point where it is injecting a voltage that will correct the supply voltage by adding or subtracting from it. For many years our on-going development programme has enhanced the performance of the EM/EMS range, moving it further and further ahead of competitors. An early breakthrough using thyatron valves in 1957 gave us 40 times faster response speeds and in 1963 we patented a solid state control system to achieve a remarkable 129 times faster response. This original power transistor concept has been continuously improved with the introduction of the latest semiconductor technology, and now incorporates velocity feedback for even faster correction. So today's EM/EMS range servo system brings you exceptionally fast response with controlled deceleration to minimise overshoot. If you need even faster action we can provide it via our unique solid state ranges, but for the vast majority of applications EM/EMS response speeds are more than sufficient, taking into account the time constant of power supplies, motors, etc, making up the load.

Over six thousand models span 1 KVA to 8,000 KVA output ratings, single or three phase, incorporating full spike and interference suppression, if required.



## ► Key Features

- **Output Voltage Accuracy:**  $\pm 0.5\%$  (0.1% if required). Accuracy maintained over the full range of input voltage variations from zero to full load irrespective of power factor, frequency variations, and ambient temperature variations from  $-15$  to  $+45^{\circ}\text{C}$  (Temperature coefficient  $0.003\%/^{\circ}\text{C}$ ). Three phase stabilisers will, in addition to the above, maintain the accuracy of each phase, both line to line and line to neutral, even if the input voltage, load and power factor are totally unbalanced.
- **Ultra Fast Response.**
- **Low Internal Impedance** capable of sustaining high surge currents.
- **Efficiency** better than 98% with up to 99.5% for larger models.
- **Waveform Distortion** negligible with any type of load.
- **Soft Start** ensures low voltage at the moment of switching on. Without this facility, particularly with wide swing stabilisers, voltage surges of 85% or more can occur.
- **Soft Stop** dampens the force of impact when the brush gear reaches the end stop. Essential on larger high speed stabilisers to prevent brush bounce resulting in RFI or even Variable Transformer burn out.
- **Full Transverse and Common Mode** spike/interference suppression when required.
- **Oil Immersed** versions for outdoor or for use in hostile environments.
- **Wide range of optional extras including the latest no break by-pass technology. Distribution boards and any other feature to customer's requirements can be built into the cabinet.**
- **EMT/EMST series stabilisers incorporate the advanced ROTAVOLT technology and additional cooling, resulting in a considerable cost and weight reduction per KVA. In the event of impeded ventilation the unit will continue to operate at a reduced output voltage whilst sounding an alarm.**



# » Technical Specifications

## » Voltage Control

### **Stabilised Output Voltage:**

Can be preset to any value within these ranges:-

<b>H Models</b>	200 to 254V output single phase 346 to 440V output three phase
<b>L Models</b>	100 to 127V output single phase 173 to 220V output three phase

Other voltages to order.

### **Output Voltage Accuracy:**

$\pm 0.5\%$  as standard or  $\pm 0.1\%$  true RMS option. Accuracy maintained over the full range of input voltage variations from zero to full load irrespective of power factor, frequency variations and ambient temperature variations from  $-15$  to  $+45^{\circ}\text{C}$ . Three phase stabilisers will, in addition to the above, maintain the output accuracy of each phase, both line to line and line to neutral, even if the input voltage, load and power factor are totally unbalanced.

### **Input Voltage Range:**

The input voltage range is shown as a percentage of the pre-set output voltage. EM models offer a choice of 7 ranges and 3 taps A, B and C. The taps can be altered at any time but not the range. EMS models offer 8 ranges.

### **Supply Frequency:**

47 to 65Hz. Other frequencies to order.

### **Power Factor:**

The load power factor has no effect on the performance.

### **Waveform Distortion:**

Negligible with any form of load.

### **Correction Time:**

The tables quote the correction speed of each model in terms of time taken to reduce a 10% change to within 2% (faster correction speeds to order).



**Efficiency:**

Better than 98% at full load with up to 99.5% for larger models.

**Surge Ratings:**

Ten times the rated current up to 2 seconds. Three times up to 1 minute. Twice up to 5 minutes.

**Environment:**

The quoted current ratings apply to ambient temperatures from -15 +45°C. Derate by 2% for each additional °C up to 70°C. Temperature stability better than 0.003% per degree C. Maximum altitude 1000 m. Derate by 2.5% for each additional 500m. EM/EMS stabilisers are suitable for indoor tropical use. For outdoor and other hostile environments EMO oil immersed stabilisers are recommended.

**Spike Suppression:**

Metal oxide transient voltage protection fitted as standard. Additional protection down to harmless levels available as an option.

**Remote Sensing:**

Separate terminals provide for monitoring the output voltage nearer to the load point, to compensate for any voltage drop in long cable runs.

**Soft Start:**

Ensures low voltage at the moment of switching on before full stabilisation takes place.

**Soft Stop:**

Dampens the force of impact when the brush gear reaches the end stop. Essential on larger high speed stabilisers to prevent brush bounce resulting in RFI or even Variable Transformer burn out.

**Construction:**

The larger EM/EMS stabilisers are enclosed in robust steel floorstanding cubicles with door access for easy installation and servicing. Lifting eyebolts are provided to assist handling during transportation. The smaller single phase models are suitable for floor or bench mounting and can be supplied in standard 19 inch rack form.

Enclosures to IP20 BS5490/IEC529. Other enclosures to order. Oil immersed stabilisers for outdoor use or contaminated environments (see page 8).

**CE Conformity:**

Conforms to the requirements of council directive 89/336/EEC EMC emissions/immunity and 73/23/EEC low voltage directive.

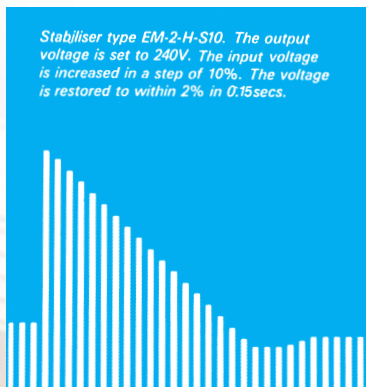
**Three Phase Models:**

Three phase stabilisers are normally supplied for "star" connection and require an incoming neutral.

If no neutral is available a static balancer will be fitted to the stabiliser. If the load also requires a neutral a larger balancer can be provided. Full accuracy of each phase will be maintained both line to line and line to neutral under all conditions of unbalance. This is often not the case with other makes of stabilisers.

**Speed of Response**

Defined as the time taken to restore a 10% voltage variation to within 2%. EM/EMS stabilisers are the most cost effective and efficient method of obtaining an undistorted stable mains supply. The speed of response is sufficient for most applications taking into account the time constant of power supplies, motors and other components making up the load. Specifying the speed of correction in terms of "volts per second" or "% per second" is misleading as it details the maximum rate of correction that the servo drive can reach, ignoring the time taken for the drive to reach full speed and slow down again. For faster speeds of response specify our "BE" range of solid state stabilisers.



# » AC Power Conditioners

## Voltage Control

Certain mains powered equipment not only requires a stable supply, maintained within specific limits, but a clean supply that is free from transient spikes and noise.

In these cases a Power Conditioner offers the ideal solution by isolating the output voltage and filtering out any noise and interference on the incoming supply.

### Transverse Mode (Symmetrical) Interference Suppression

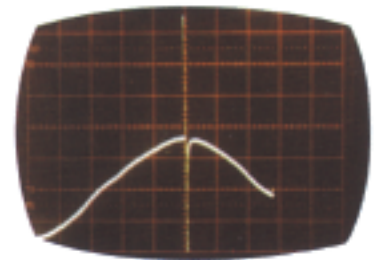
This will suppress any spikes, transients or noise between line and neutral, or line to line. While all our stabilisers are fitted with 'spike clippers' as standard, this extra attenuation will reduce a 7KV 200 micro second pulse to a harmless ripple. The attenuation is of equal magnitude from off load to full load.

### Common Mode (Asymmetrical) Interference Suppression

This will eliminate any potential difference, i.e. spikes, transients or noise developing between earth and neutral, or earth and line. A screened, double wound isolating transformer is connected to the output of the stabiliser, enabling the secondary neutral to be earthed and at that point the common mode interference is ZERO. A floating secondary is not desirable nor safe.

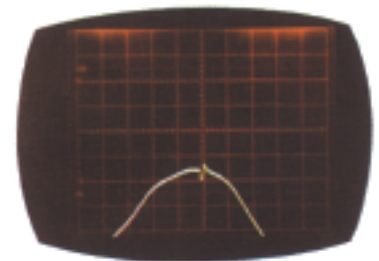
### Optional Lightning Arrestors

Can be provided if requested, to protect your power conditioner and load from the harmful effects of induced lightning strikes to the incoming supply distribution network.



### INPUT PULSE

Rise Time: 0.25 micro sec.  
Duration: 5 micro sec.  
dV/dT: 7KV/micro sec.



### ATTENUATION

30 to 1 (-30dB).  
Absolute limit of 18% above the peak of the stabilised voltage

*The oscillograms show the Transverse Mode attenuation of a spike/pulse on the incoming supply. It is important that a Power Conditioner can provide spike/pulse attenuation as well as noise attenuation.*



# Oil Immersed Stabilisers

Watford Control

For outdoor use or any installation in humid or contaminated environments. The EMO range of EM voltage stabilisers are supplied in robust oil filled steel tanks. The oil immersion of stabilisers also results in more efficient cooling and a reduction in size compared to air cooled stabilisers. They are available in single and three phase models. The smaller units to 100KVA are suitable for pole mounting and are designed for use in overhead distribution networks. The stabilisers normally require a neutral, however they can be supplied with a static balancing transformer for three-phase 3-wire systems.

## Enclosures:

The stabilisers are enclosed in a welded sheet steel tank, all covers are lipped to prevent any ingress of moisture and are retained by stainless steel bolts. Supplied complete with lifting lugs, and a pole clamp (if applicable), all finished in Dark Admiralty Grey (RAL 7031). The enclosures are fitted with the following: Oil sight gauge, Free air breather tube, Porcelain bushings, Earth terminal.

## Insulating Oil:

An uninhibited transformer oil is used, conforming to IEC 296 ('82) class 1 & 2 and BS 148('84) class 1 & 2 specification.



# Power Efficiency Conditioners

## Watford Control



### Power Factor Correction

Depending on the nature of electrical loads considerable savings in electricity bills can be achieved by correcting the power factor.

The active power of a load is drawn (and paid for) from the supply is measured in kilowatts (kW). The apparent power of the load is the multiple of Current and Voltage (kVA). The ratio of the active power (kW) to the apparent power (kVA) is known as the power factor and referred to as  $\cos \Phi$ .

In addition to the kilowatts per hour consumed, a charge is also made by the supply authority for the maximum kVA demand on the supply. If the maximum kVA can be reduced considerable savings can be made.

This is achieved by connecting suitable sized capacitors to the supply compensating the reactive component of the load, reducing  $\cos \Phi$  closer to unity (1.0). The nearer  $\cos \Phi$  is to unity the less reactive power is drawn and the greater the savings on the utility bills. However in practice it is often uneconomic to improve the power factor greater than 0.9 as the size of the capacitors would be extremely large and the cost would outweigh any utility saving.

Power factor correction can be supplied as separate units or fitted to our EM range of voltage stabilisers and power conditioners.

This option can be in the form of a fixed capacitor bank, suitable for applications where the load and power factor is fixed and is not likely to change. Alternately the stabiliser can be fitted with a power factor control system to automatically vary the correction capacitance in pre-set steps to ensure optimum power factor improvement irrespective of load variations.

To enable us to calculate your requirements we will require the following information:-

- The existing power factor of the load ( $\cos \Phi 1$ )
- Rating of the load (kW)
- Operating voltage
- The required power factor after improvement ( $\cos \Phi 2$ )
- Type of correction fixed or variable.

Improvement of power factor will result in a reduction in the overall cost of electricity bills. For example a 3 phase 100kW 400V load with a power factor of  $\cos \Phi 1 = 0.6$  will draw a current of 242 A. per phase which is equal to a 167kVA demand on the supply.



Improving the power factor to  $\cos \Phi = 1.0$  the line current will be reduced to 144A. reducing the load to 100kVA, lowering the burden on the supply/distribution network and increasing their operational life, or permitting the existing supply/distribution network to support additional loads without the need and costs involved in upgrading the incoming utility supply.

## Harmonic Distortion & Excessive Neutral Currents

In balanced three phased loads when all phases are equally loaded there will be virtually no current flowing in the neutral conductor.

However, non-linear and unbalanced loads generate harmonic currents, the most significant being the third harmonic (150 Hz for 50 Hz supplies). In a three phase system these harmonic currents sum together to produce high currents in the neutral conductor which can be more than

twice the level of the current flowing in the phase conductors.

Most of the electrical installations in factories and offices currently rely on neutral conductors sized to carry half the rated phase current. In these instances there is a significant danger of cable and switch gear overheating, also as the neutral is not protected by a fuse there is a serious risk of fire. Higher order harmonics can also be induced by non-linear loads, creating distortion on the mains supply. This can result in overheating, accelerated ageing in electrical equipment and increased utility bills, as the current drawn by harmonics is totally wasted.

A harmonic filter can be provided as an option to any of our AC Voltage Stabilisers and Power Conditioners, eliminating the third harmonic and excessive neutral current from the supply network. If necessary additional filter networks can be added to significantly reduce the level of the higher order harmonics.

**All our AC Voltage Stabilisers and Power Conditioners can be fitted with optional accessories to suit any requirements that may arise. Listed below are some of the standard extras which we can fit. If you should require any item that is not listed or require a special enclosure or need a paint finish to match existing equipment, please contact our sales office.**

**Voltmeter** including phase selector switch on three phase models.

**Ammeter** including phase selector switch on three phase models.

**Frequency Meter.**

**Soft Start** optional on all models

**Additional Transient Attenuation** transverse mode spike attenuation (detailed on page 7).

**Common Mode Suppression** common mode noise and spike attenuation (detailed on page 7).

**Induced Lightning Arrestors** additional protection to protect the stabiliser and load from the harmful effect of induced lightning strikes.

**Electronic Over/Under Voltage Relay** monitors the output voltage and is actuated if the voltage deviates below or above pre-set levels. Can be used to actuate alarms, logic circuits or contactors.

**Low Frequency/ High Voltage Relay** monitors the output and is actuated if the frequency deviates below or the voltage above a pre-set level.

**Electronic High Voltage Trip** operates in conjunction with an output circuit breaker and will trip if output voltage deviates above a pre-set level for a pre-set time.

**Phase Rotation/Failure Relay** monitors the incoming supply to ensure correct phase rotation and that all three phases are present.

**Input Circuit Breaker.**

**Output Circuit Breaker**

**Motor Drive** for circuit breakers (Input and/or Output) can be supplied in conjunction with electronic relays allowing for fully automatic operation.

**By-Pass Switch** either supplied as a separate item (the recommended method) or incorporated in the stabiliser enclosure. Operation of the switch will transfer the load directly to the incoming supply and isolate the stabiliser.

**No Break By-Pass Switch** (EMS series only). When operated the stabiliser is by-passed without any interruption or phase shift to the load whatsoever.

**Static Balancing Transformer** can be fitted where there is no incoming neutral allowing the stabiliser to be operated on a three phase three wire system. If the load also requires a four wire system a larger static balancer will be required and this must be specified.

**Distribution Panel** for multiple MCB protected outputs, panel mounted within the stabiliser enclosure.

**Power Factor Correction**

**Harmonic Suppression**

# » Duoreg Stabilisers

## Watford Control

### Duoreg Stabilisers:

The Duoreg range of stabilisers from Watford Control offers the proven reliability and essential features of the EM range of stabilisers, but at a considerably lower cost. Available in 4 frame sizes.

#### Technical Specification:

Preset for any voltage between 220 and 240 volts or 110 to 120 volts.

#### Output Voltage Accuracy:

+/-1% for all input voltage, frequency and load variations.

#### Input Voltage:

Single phase -20% to +10% of preset output voltage (Duoreg 1). -20% to +15% (Duoreg 2-4 models).

#### Supply Frequency:

47 to 65Hz.

#### Speed of Response:

A 10% supply variation will be corrected to within 2.5% in 0.3 seconds.

#### Efficiency:

Better than 98%.

#### Waveform Distortion:

Negligible.

#### Power factor:

Unaffected by power factor.

#### Spike Suppression:

Metal oxide transient voltage suppressors fitted as standard.

#### Surge Ratings:

Capable of sustaining:-

5 x max. current for 1 second

2 x max. current for 20 seconds

1.5 max. current for 2 minutes.

#### Construction:

The Duoreg units are supplied in robust ventilated sheet steel enclosures. Models with ratings up to and including 13 Amps are supplied complete with output circuit breaker, 1.5 metre input cable, 3 pin 13A output socket with fused plug and high/low voltage indicator. All other models above 13A are supplied suitable for hard wiring to both input and output terminals.



#### Environment:

Temperature range 0 to 40 degrees C. Derate by 2% for each additional degree C up to maximum of 60 degrees C.

Maximum altitude 100m. Derate by 2.5% for each additional 500m. Suitable for indoor tropical use, up to 95% RH, non condensing.

#### Three Phase Operation

Three single units connected in star configuration will provide a very economical three phase supply, stabilising both line to neutral and line to line voltages within +/-1% irrespective of phase balance.

#### Duoreg Power Conditioners:

The Iso-Duoreg power conditioner has the same features as the Duoreg but offers total protection to the load from high energy spikes and noise on the mains supply.

#### High Energy spike Attenuation:

A 50 microsecond energy pulse of 300V peak is attenuated to a harmless 20 volt low frequency ripple. Shorter duration pulses are attenuated to a greater extent.

#### High Frequency Noise:

The output is fully isolated from the incoming supply, by earthing the output neutral common mode noise is virtually eliminated. Do not earth equipment at any other point.

### DUOREG STABILISERS (230 & 115 VOLT RANGE)

	Output Current	kVA@ 230V	kVA@ 115V	Dimensions			
				Width	Depth	Height	Weight
Duoreg 1	4.2	1.0	0.5	206	270	168	7
Duoreg 2	12	2.8	1.4	292	315	240	20
Duoreg 2.5	18	4.1	2.1	292	315	240	20
Duoreg 3	22	5.1	2.5	292	315	464	46
Duoreg 4	40	9.2	4.6	292	315	464	58
Iso-Duoreg 1	4.2	1.0	0.5	206	315	320	27
Iso-Duoreg 2	12	2.8	1.4	292	315	464	54
Iso-Duoreg 2.5	18	4.1	2.1	292	315	464	58



# How to Select and Order Information Required

1. kVA of load (RMS) .....
2. Single or three phase .....
3. Load current ..... A (RMS)
4. Output Voltage ..... V (Line-to-Neutral)..... V (Line-toLine)
5. Accuracy  $\pm 0.5\%$  standard, if accuracy of  $\pm 5\%$  is specified the input voltage range can be extended as shown).
6. Input Voltage Variations:- ..... % to + ..... %

## Note

The Input Voltage range is a function of the Output Voltage

## EM Stabilisers

Each frame size is available in 7 ranges from 15% total input voltage range (S50)  $\pm 0.5\%$  output, to 60% total input voltage range (S20)  $\pm 5\%$  output.

Specify tap A, B or C. The model is determined in manufacture but the tap can be altered at any time.

## EMS Stabilisers

Each frame size available in 8 ranges with equal under and over voltage correction. From 16% total input voltage range (R8)  $\pm 0.5\%$  output, to 60% total input voltage range (R25)  $\pm 5\%$  output. The more effective utilisation of the buck-boost principle results in a considerable weight and cost reduction over the EM range.

## EMT & EMST Stabilisers

Incorporate the advanced ROTAVOLT technology and additional cooling, resulting in an even greater cost and weight reduction per kVA. In the event of impeded ventilation the unit will continue to operate at a reduced output voltage whilst sounding an alarm.

## EM & EMT MODELS

SERIES	Input Voltage Range for Output Accuracy $\pm 0.5\%$ Tap Setting			Input Voltage Range for Output Accuracy $\pm 5.0\%$ Tap Setting		
	A	B	C	A	B	C
<b>S50</b>	-10%	-7.5%	-5%	-14%	-11.5%	-9%
	+5%	+7.5%	+10%	+11%	+13.5%	+16%
<b>S80</b>	-15%	-11%	-7%	-19%	-15%	-11%
	+7%	+11%	+15%	+13%	+17%	+21%
<b>S10</b>	-18%	-13%	-8%	-22%	-17%	-12%
	+8%	+13%	+18%	+14%	+19%	+24%
<b>S12</b>	-20%	-15%	-10%	-24%	-19%	-14%
	+10%	+15%	+20%	+16%	+21%	+26%
<b>S14</b>	-25%	-18.5%	-12%	-29%	-22.5%	-16%
	+12%	+18.5%	+25%	+18%	+24.5%	+31%
<b>S17</b>	-30%	-22%	-14%	-34%	-26%	-18%
	+14%	+22%	+30%	+20%	+28%	+36%
<b>S20</b>	-35%	-25%	-16%	-39%	-29%	-20%
	+16%	+25%	+35%	+22%	+31%	+41%

## EMS & EMST MODELS

SERIES	Input Voltage Range for Output Accuracy $\pm 1.0\%$	Input Voltage Range for Output Accuracy $\pm 5.0\%$
<b>R8</b>	$\pm 8\%$	-12%      +14%
<b>R10</b>	$\pm 10\%$	-14%      +16%
<b>R12</b>	$\pm 12\%$	-16%      +18%
<b>R15</b>	$\pm 15\%$	-19%      +21%
<b>R18</b>	$\pm 18\%$	-22%      +24%
<b>R20</b>	$\pm 20\%$	-24%      +26%
<b>R23</b>	$\pm 23\%$	-27%      +29%
<b>R25</b>	$\pm 25\%$	-29%      +31%

The Input Voltage Range is shown as a Percentage of the Preset Output Voltage



# Rating Table EM AC Voltage Stabilisers

## Water Control

### EM STABILISERS (400/230 VOLT RANGE)

#### S50

A	B	C
-10%	+/-7.5%	-5%
+5%		+10%

Output Current	Kva@230V 1 P	Kva@400V 3 P	Correction Time (sec)
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#### S80

A	B	C
-15%	+/-11%	-7%
+7%		+15%

Output Current	Kva@230V 1 P	Kva@400V 3 P	Correction Time (sec)
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#### S10

A	B	C
-18%	+/-13%	-8%
+8%		+18%

Output Current	Kva@230V 1 P	Kva@400V 3 P	Correction Time (sec)
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#### S12

A	B	C
-20%	+/-15%	-10%
+10%		+20%

Output Current	Kva@230V 1 P	Kva@400V 3 P	Correction Time (sec)
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EM	2 H	28	6.5	19	0.30
EM	3 H	56	13	39	0.40
EM	3.5 H	106	24	73	0.40
EM	4 H	127	29	87	0.50
EM	5 H	211	49	146	0.55
EM	6 H	422	97	291	1.05
EM	7 H	634	146	437	1.05
EM	8 H	845	194	583	1.25
EM	9 H	1056	243	729	1.25
EM	10 H	1267	291	874	1.25
EM	11 H	1479	340	1020	1.25
EM	13 H	1901	437	1312	1.25
EM	14 H	2112	486	1457	1.25
EM	16 H	2535	583	1749	1.25
EM	18 H	2957	680	2040	1.25
EM	22 H	3802	874	2623	1.25
Turbo					
EM T	3.5 H	162	37	112	0.40
EM T	5 H	317	73	219	0.55
EM T	6 H	634	146	437	1.05
EM T	7 H	950	219	656	1.05
EM T	8 H	1267	291	874	1.25
EM T	9 H	1584	364	1093	1.25
EM T	10 H	1901	437	1312	1.25
EM T	11 H	2218	510	1530	1.25
EM T	13 H	2851	656	1967	1.25
EM T	14 H	3168	729	2186	1.25
EM T	16 H	3802	874	2623	1.25
EM T	18 H	4436	1020	3061	1.25
EM T	22 H	5703	1312	3935	1.25

### EM Stabilisers (200/115 Volt Range)

#### S50

A	B	C
-10%	+/-7.5%	-5%
+5%		+10%

Output Current	Kva@115V 1 P	Kva@200V 3 P	Correction Time (sec)
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#### S80

A	B	C
-15%	+/-11%	-7%
+7%		+15%

Output Current	Kva@115V 1 P	Kva@200V 3 P	Correction Time (sec)
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#### S10

A	B	C
-18%	+/-13%	-8%
+8%		+18%

Output Current	Kva@115V 1 P	Kva@200V 3 P	Correction Time (sec)
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#### S12

A	B	C
-20%	+/-15%	-10%
+10%		+20%

Output Current	Kva@115V 1 P	Kva@200V 3 P	Correction Time (sec)
----------------	-----------------	-----------------	--------------------------

EM	2 L	50	5.7	17	0.30
EM	3 L	125	14.4	43	0.40
EM	4 L	211	24	73	0.50
EM	5 L	429	49	148	0.55
EM	6 L	858	99	296	1.05
EM	7 L	1287	148	444	1.05
EM	8 L	1716	197	592	1.25
EM	9 L	2145	247	740	1.25
EM	10 L	2574	296	888	1.25
EM	11 L	3003	345	1036	1.25
EM	13 L	3861	444	1332	1.25
EM	14 L	4290	493	1480	1.25
EM	16 L	5148	592	1776	1.25
EM	18 L	6006	691	2072	1.25
EM	22 L	7723	888	2664	1.25
Turbo					
EM T	3.5 L	160	18	55	0.40
EM T	5 L	644	74	222	0.55
EM T	6 L	1287	148	444	1.05
EM T	7 L	1931	222	666	1.05
EM T	8 L	2574	296	888	1.25
EM T	9 L	3218	370	1110	1.25
EM T	10 L	3861	444	1332	1.25
EM T	11 L	4505	518	1554	1.25
EM T	13 L	5792	666	1998	1.25
EM T	14 L	6435	740	2220	1.25
EM T	16 L	7723	888	2664	1.25
EM T	18 L	9010	1036	3108	1.25
EM T	22 L	11584	1332	3996	1.25

## How to select

1. Select required input voltage range, listed in the different coloured columns under 'S' number
2. Look for the kVA or current rating to suit the load
3. The model number is indicated on the left hand column
4. To specify state the model number followed by 'H' or 'L' together with the 'S' number which indicated the required input voltage swing
5. Specify tap 'A' 'B' or 'C'. The model series is specified during manufacturer but the tap can be altered at any time.

### EM STABILISERS (400/230 VOLT RANGE)

#### S14

A	B	C
-25%	+/-18.5%	-12%
+12%		+25%

Output Current	Kva@230V 1 P	Kva@400V 3 P	Correction Time (sec)
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#### S17

A	B	C
-30%	+/-22%	-14%
+14%		+30%

Output Current	Kva@230V 1 P	Kva@400V 3 P	Correction Time (sec)
----------------	-----------------	-----------------	--------------------------

#### S20

A	B	C
-35%	+/-25%	-16%
+16%		+35%

Output Current	Kva@230V 1 P	Kva@400V 3 P	Correction Time (sec)
----------------	-----------------	-----------------	--------------------------

EM 2 H	9	2.1	6.4	0.15
EM 3 H	19	4.3	13	0.20
EM 3.5 H	35	8	24	0.20
EM 4 H	42	10	29	0.20
EM 5 H	69	16	48	0.20
EM 6 H	139	32	96	0.35
EM 7 H	208	48	144	0.35
EM 8 H	278	64	192	0.45
EM 9 H	347	80	240	0.45
EM 10 H	417	96	288	0.45
EM 11 H	486	112	335	0.45
EM 13 H	625	144	431	0.45
EM 14 H	695	160	479	0.45
EM 16 H	834	192	575	0.45
EM 18 H	972	224	671	0.45
EM 22 H	1250	288	863	0.45

7	1.5	4.9	0.15
14	3.3	9.9	0.20
27	6.2	19	0.20
32	7.4	22	0.20
54	12	37	0.20
107	25	74	0.35
161	37	111	0.35
215	49	148	0.45
269	62	185	0.45
322	74	222	0.45
376	86	259	0.45
483	111	334	0.45
537	124	371	0.45
645	148	445	0.45
752	173	519	0.45
967	222	667	0.45

6	1.3	3.9	0.15
11	2.6	7.8	0.20
21	4.9	15	0.20
25	5.9	18	0.20
42	10	29	0.20
85	20	59	0.35
127	29	88	0.35
170	39	117	0.45
212	49	146	0.45
255	59	176	0.45
297	68	205	0.45
382	88	264	0.45
425	98	293	0.45
510	117	352	0.45
594	137	410	0.45
764	176	527	0.45

Turbo

EM T 3.5 H	53	12	37	0.20
EM T 5 H	104	24	72	0.20
EM T 6 H	208	48	144	0.35
EM T 7 H	313	72	216	0.35
EM T 8 H	417	96	288	0.45
EM T 9 H	521	120	359	0.45
EM T 10 H	625	144	431	0.45
EM T 11 H	729	168	503	0.45
EM T 13 H	938	216	647	0.45
EM T 14 H	1042	240	719	0.45
EM T 16 H	1250	288	863	0.45
EM T 18 H	1459	335	1006	0.45
EM T 22 H	1875	431	1294	0.45

41	9.5	28	0.20
81	19	56	0.20
161	37	111	0.35
242	56	167	0.35
322	74	222	0.45
403	93	278	0.45
483	111	334	0.45
564	130	389	0.45
735	167	500	0.45
806	185	556	0.45
967	222	667	0.45
1128	259	778	0.45
1450	334	1001	0.45

33	7.5	22	0.20
64	15	44	0.20
127	29	88	0.35
191	44	132	0.35
255	59	176	0.45
318	73	220	0.45
382	88	264	0.45
446	103	308	0.45
573	132	396	0.45
637	146	439	0.45
764	176	527	0.45
892	205	615	0.45
1146	264	791	0.45

### EM Stabilisers (200/115 Volt Range)

#### S14

A	B	C
-25%	+/-18.5%	-12%
+12%		+25%

Output Current	Kva@115V 1 P	Kva@200V 3 P	Correction Time (sec)
----------------	-----------------	-----------------	--------------------------

#### S17

A	B	C
-30%	+/-22%	-14%
+14%		+30%

Output Current	Kva@115V 1 P	Kva@200V 3 P	Correction Time (sec)
----------------	-----------------	-----------------	--------------------------

#### S20

A	B	C
-35%	+/-25%	-16%
+16%		+35%

Output Current	Kva@115V 1 P	Kva@200V 3 P	Correction Time (sec)
----------------	-----------------	-----------------	--------------------------

EM 2 L	16	1.9	5.6	0.15
EM 3 L	41	4.7	14.2	0.20
EM 4 L	69	8.0	24	0.20
EM 5 L	141	16	49	0.20
EM 6 L	282	32	97	0.35
EM 7 L	423	49	146	0.35
EM 8 L	564	65	195	0.45
EM 9 L	705	81	243	0.45
EM 10 L	847	97	292	0.45
EM 11 L	988	114	341	0.45
EM 13 L	1270	146	438	0.45
EM 14 L	1411	163	487	0.45
EM 16 L	1693	195	584	0.45
EM 18 L	1975	227	681	0.45
EM 22 L	2540	292	876	0.45

13	1.5	4.4	0.15
32	3.7	11.0	0.20
54	6.2	18.5	0.20
109	13	38	0.20
218	25	75	0.35
327	38	113	0.35
436	50	151	0.45
545	63	188	0.45
655	75	226	0.45
764	88	263	0.45
982	113	339	0.45
1091	125	376	0.45
1309	151	452	0.45
1527	178	527	0.45
1964	226	677	0.45

10	1.2	3.5	0.15
25	2.9	8.7	0.20
42	4.9	15	0.20
86	10	30	0.20
172	20	60	0.35
259	30	89	0.35
345	40	119	0.45
431	50	149	0.45
517	60	179	0.45
604	69	208	0.45
776	89	268	0.45
862	99	298	0.45
1035	119	357	0.45
1207	139	417	0.45
1552	179	536	0.45

Turbo

EM T 3.5 L	53	6.1	18	0.20
EM T 5 L	212	24	73	0.20
EM T 6 L	423	49	148	0.35
EM T 7 L	635	73	219	0.35
EM T 8 L	847	97	292	0.45
EM T 9 L	1058	122	365	0.45
EM T 10 L	1270	146	438	0.45
EM T 11 L	1481	170	511	0.45
EM T 13 L	1905	219	657	0.45
EM T 14 L	2116	243	730	0.45
EM T 16 L	2540	292	876	0.45
EM T 18 L	2963	341	1022	0.45
EM T 22 L	3809	438	1314	0.45

41	4.7	14	0.20
164	19	56	0.20
327	38	113	0.35
491	56	169	0.35
655	75	226	0.45
818	94	282	0.45
982	113	339	0.45
1146	132	395	0.45
1473	169	508	0.45
1636	188	565	0.45
1964	226	677	0.45
2291	263	790	0.45
2946	339	1016	0.45

32	3.7	11	0.20
129	15	45	0.20
259	30	89	0.35
388	45	134	0.35
517	60	179	0.45
647	74	223	0.45
776	89	268	0.45
906	104	312	0.45
1164	134	402	0.45
1294	149	446	0.45
1552	179	536	0.45
1811	208	625	0.45
2329	268	803	0.45



# Rating Table EMS AC Voltage Stabilisers

Water Control

## EMS STABILISERS (400/230 VOLT RANGE)

### R8

+/-8%

	Output Current	Kva@230V	Kva@400V	Correction Time (sec)
		1 P	3 P	
EMS 21E0 H	100	23	69	1.40
EMS 21E1 H	197	45	136	0.80
EMS 2101 H	394	91	272	0.80
EMS 2102 H	788	181	544	0.80
EMS 2103 H	1182	272	816	0.80
EMS 2104 H	1577	363	1088	0.80
EMS 2106 H	2365	544	1632	0.80
EMS 2108 H	3153	725	2176	0.80
EMS 2110 H	3942	907	2720	0.80
EMS 2112 H	4730	1088	3264	0.80
EMS 2114 H	5518	1269	3808	0.80
EMS 2116 H	6307	1451	4352	0.80
EMS 2118 H	7095	1632	4895	0.80

### R10

+/-10%

	Output Current	Kva@230V	Kva@400V	Correction Time (sec)
		1 P	3 P	
78	18	54	1.40	
154	35	106	0.80	
308	71	213	0.80	
616	142	425	0.80	
924	213	638	0.80	
1232	283	850	0.80	
1848	425	1295	0.80	
2464	567	1700	0.80	
3080	708	2125	0.80	
3698	850	2550	0.80	
4312	992	2976	0.80	
4928	1451	4352	0.80	
5544	1275	3826	0.80	

### R12

+/-12%

	Output Current	Kva@230V	Kva@400V	Correction Time (sec)
		1 P	3 P	
64	15	44	1.00	
125	29	86	0.60	
251	58	173	0.60	
501	115	346	0.60	
752	173	519	0.60	
1002	231	692	0.60	
1504	346	1037	0.60	
2005	461	1383	0.60	
2506	576	1729	0.60	
3007	692	2075	0.60	
3508	807	2421	0.60	
4010	922	2767	0.60	
4511	1037	3112	0.60	

### R15

+/-15%

	Output Current	Kva@230V	Kva@400V	Correction Time (sec)
		1 P	3 P	
49	11	34	1.00	
97	22	76	0.60	
193	44	133	0.60	
386	89	267	0.60	
580	133	400	0.60	
773	178	533	0.60	
1159	267	800	0.60	
1545	355	1066	0.60	
1932	444	1333	0.60	
2318	533	1599	0.60	
2704	622	1866	0.60	
3091	711	2133	0.60	
3477	800	2399	0.60	

### Turbo

EMS T 21E0 H	153	35	106	1.40
EMS T 21E1 H	296	68	204	0.80
EMS T 2101 H	591	136	408	0.80
EMS T 2102 H	1182	272	816	0.80
EMS T 2103 H	1174	408	1224	0.80
EMS T 2104 H	2365	544	1632	0.80
EMS T 2106 H	3547	816	2448	0.80
EMS T 2108 H	4730	1088	3284	0.80
EMS T 2110 H	5912	1360	4080	0.80
EMS T 2112 H	7095	1632	4895	0.80
EMS T 2114 H	8277	1904	5711	0.80
EMS T 2116 H	9460	2716	6527	0.80
EMS T 2118 H	10642	2448	7343	0.80

120	28	83	1.40
231	28	129	0.80
462	106	319	0.80
924	213	638	0.80
1386	319	956	0.80
1848	425	1275	0.80
2772	638	1913	0.80
3698	850	2550	0.80
4620	1063	3188	0.80
5544	1275	3826	0.80
6468	1488	4463	0.80
7393	1700	5151	0.80
8317	1913	5738	0.80

97	22	67	1.00
188	43	130	0.60
376	86	259	0.60
752	173	519	0.60
1128	259	778	0.60
1504	346	1037	0.60
2255	519	1556	0.60
3007	692	2075	0.60
3759	865	2594	0.60
4511	1037	3112	0.60
5263	1210	3631	0.61
6014	1383	4150	0.60
6766	1556	4669	0.60

75	17	52	1.00
145	33	100	0.60
290	67	200	0.60
580	133	400	0.60
869	200	600	0.60
1159	267	800	0.60
1739	400	1200	0.60
2318	533	1599	0.60
2898	666	1999	0.60
3477	800	2399	0.60
5263	1210	3631	0.60
6014	1383	4150	0.60
6766	1556	4669	0.60

## EMS Stabilisers (200/115 Volt Range)

### R8

+/-8%

	Output Current	Kva@115V	Kva@200V	Correction Time (sec)
		1 P	3 P	
EMS 21E0 L	137	16	47	1.40
EMS 21E1 L	394	45	136	0.80
EMS 2101 L	940	108	324	0.80
EMS 2102 L	1881	216	649	0.80
EMS 2103 L	2821	324	973	0.80
EMS 2104 L	3761	433	1298	0.80
EMS 2106 L	5642	649	1947	0.80
EMS 2108 L	7523	865	2595	0.80
EMS 2110 L	9404	1081	3244	0.80
EMS 2112 L	11284	1298	3893	0.80
EMS 2114 L	13165	1514	4542	0.80
EMS 2116 L	15046	1730	5191	0.80
EMS 2118 L	16926	1947	5840	0.80

### R10

+/-10%

	Output Current	Kva@115V	Kva@200V	Correction Time (sec)
		1 P	3 P	
107	12	37	1.40	
308	35	106	0.80	
735	85	254	0.80	
1470	169	507	0.80	
2205	254	761	0.80	
2939	338	1014	0.80	
4409	507	1521	0.80	
5879	676	2028	0.80	
7349	845	2535	0.80	
8818	1014	3042	0.80	
10288	1183	3549	0.80	
11758	1352	4056	0.80	
13227	1521	4563	0.80	

### R12

+/-12%

	Output Current	Kva@115V	Kva@200V	Correction Time (sec)
		1 P	3 P	
87	10	30	1.00	
251	29	86	0.60	
598	69	206	0.60	
1196	138	413	0.60	
174	206	619	0.60	
2391	275	825	0.60	
3587	413	1238	0.60	
4783	550	1650	0.60	
5979	688	2063	0.60	
7174	825	2475	0.60	
8370	963	2888	0.60	
9566	1100	3300	0.60	
10761	1238	3713	0.60	

### R15

+/-15%

	Output Current	Kva@115V	Kva@200V	Correction Time (sec)
		1 P	3 P	
67	8	23	1.00	
193	22	67	0.60	
461	53	159	0.60	
922	106	318	0.60	
1383	159	477	0.60	
1843	212	636	0.60	
2765	318	954	0.60	
3687	424	1272	0.60	
4609	530	1590	0.60	
5530	636	1908	0.60	
6452	742	2226	0.60	
7374	848	2544	0.60	
8295	954	2862	0.60	

### Turbo

EMS T 21E0 L	205	24	71	1.40
EMS T 21E1 L	591	68	204	0.80
EMS T 2101 L	1411	162	487	0.80
EMS T 2102 L	2821	324	973	0.80
EMS T 2103 L	4232	487	1460	0.80
EMS T 2104 L	5642	649	1947	0.80
EMS T 2106 L	8463	973	2920	0.80
EMS T 2108 L	11284	1298	3893	0.80
EMS T 2110 L	14105	1622	4866	0.80
EMS T 2112 L	16926	1947	5840	0.80
EMS T 2114 L	19747	2271	6813	0.80
EMS T 2116 L	22568	2595	7786	0.80
EMS T 2118 L	25389	2920	8759	0.80

160	18	55	1.40
462	53	159	0.80
1102	127	380	0.80
2205	254	761	0.80
3307	380	1141	0.80
4409	507	1521	0.80
6614	761	2282	0.80
8818	1014	3042	0.80
11023	1268	3803	0.80
13227	1521	4563	0.80
15432	1775	5324	0.80
17637	2028	6085	0.80
19841	2282	6845	0.80

130	15	45	1.00
376	43	130	0.60
897	103	309	0.60
1794	206	619	0.60
2690	309	928	0.60
3587	413	1238	0.60
5381	619	1856	0.60
7174	825	2475	0.60
8968	1031	3094	0.60
10761	1238	3713	0.60
12555	1444	4331	0.60
14349	1650	4950	0.60
16142	1856	5569	0.60

100	12	35	1.00
290	33	100	0.60
691	79	238	0.60
1383	159	477	0.60
2074	238	715	0.60
2765	318	954	0.60
4148	477	1431	0.60
5530	636	1908	0.60
6913	795	2385	0.60
8295	954	2862	0.60
9678	1113	3339	0.60
11061	1272	3816	0.60
12443	1431	4293	0.60

## How to select

1. Select required input voltage range, listed in the different coloured columns under 'R' number
2. Look for the kVA or current rating to suit the load
3. The model number is indicated on the left hand column
4. To specify state the model number followed by 'H' or 'L' together with the 'S' number which indicated the required input voltage swing

### EMS STABILISERS (400/230 VOLT RANGE)

#### R18

+/-18%

Output	Kva@230V	Kva@400V	Correction
Current	1 P	3 P	Time (sec)

EMS 21E0 H	39	9	27	0.70
EMS 21E1 H	77	18	53	0.40
EMS 2101 H	155	36	107	0.40
EMS 2102 H	310	71	214	0.40
EMS 2103 H	465	107	321	0.40
EMS 2104 H	620	143	428	0.40
EMS 2106 H	929	214	641	0.40
EMS 2108 H	1239	285	855	0.40
EMS 2110 H	1549	356	1069	0.40
EMS 2112 H	1859	428	1283	0.40
EMS 2114 H	21	499	1496	0.49
EMS 2116 H	2478	570	1710	0.49
EMS 2118 H	2788	641	1924	0.40

#### R20

+/-20%

Output	Kva@230V	Kva@400V	Correction
Current	1 P	3 P	Time (sec)

EMS 21E0 H	34	7.9	24	0.70
EMS 21E1 H	68	16	47	0.40
EMS 2101 H	136	31	94	0.40
EMS 2102 H	272	62	187	0.40
EMS 2103 H	407	94	281	0.40
EMS 2104 H	543	125	375	0.40
EMS 2106 H	815	187	562	0.40
EMS 2108 H	1086	250	749	0.40
EMS 2110 H	1358	312	937	0.40
EMS 2112 H	1629	375	1124	0.40
EMS 2114 H	1901	437	1311	0.40
EMS 2116 H	2172	500	1499	0.40
EMS 2118 H	2444	562	1686	0.40

#### R23

+/-23%

Output	Kva@230V	Kva@400V	Correction
Current	1 P	3 P	Time (sec)

EMS 21E0 H	29	6.6	20	0.50
EMS 21E1 H	57	13	39	0.30
EMS 2101 H	113	26	78	0.30
EMS 2102 H	227	52	156	0.30
EMS 2103 H	340	78	234	0.30
EMS 2104 H	453	104	313	0.30
EMS 2106 H	680	156	469	0.30
EMS 2108 H	906	208	625	0.30
EMS 2110 H	1133	261	782	0.30
EMS 2112 H	1359	313	938	0.30
EMS 2114 H	1586	365	1094	0.30
EMS 2116 H	1812	417	1251	0.30
EMS 2118 H	2039	469	1407	0.30

#### R25

+/-25%

Output	Kva@230V	Kva@400V	Correction
Current	1 P	3 P	Time (sec)

EMS 21E0 H	26	5.9	18	0.50
EMS 21E1 H	51	11.6	35	0.30
EMS 2101 H	101	23.3	70	0.30
EMS 2102 H	203	46.6	140	0.30
EMS 2103 H	304	69.9	210	0.30
EMS 2104 H	405	93.2	280	0.30
EMS 2106 H	608	139.8	419	0.30
EMS 2108 H	810	186.4	559	0.30
EMS 2110 H	1013	233.0	699	0.30
EMS 2112 H	1216	279.6	839	0.30
EMS 2114 H	1418	326.2	979	0.30
EMS 2116 H	1621	372.8	1118	0.30
EMS 2118 H	1823	419.4	1258	0.30

#### Turbo

EMS T 21E0 H	60	14	42	0.70
EMS T 21E1 H	116	27	80	0.40
EMS T 2101 H	232	53	160	0.40
EMS T 2102 H	465	107	321	0.40
EMS T 2103 H	697	160	481	0.40
EMS T 2104 H	929	214	641	0.40
EMS T 2106 H	134	321	962	0.40
EMS T 2108 H	1859	428	1283	0.40
EMS T 2110 H	2323	534	1603	0.40
EMS T 2112 H	2788	641	1924	0.40
EMS T 2114 H	3253	748	2244	0.40
EMS T 2116 H	3717	855	2565	0.40
EMS T 2118 H	4182	962	2886	0.40

EMS T 21E0 H	53	12	36	0.70
EMS T 21E1 H	102	23	70	0.40
EMS T 2101 H	204	47	141	0.40
EMS T 2102 H	407	94	281	0.40
EMS T 2103 H	611	141	422	0.40
EMS T 2104 H	815	187	562	0.40
EMS T 2106 H	1222	281	843	0.40
EMS T 2108 H	1629	375	1124	0.40
EMS T 2110 H	2036	468	1405	0.40
EMS T 2112 H	2444	562	1686	0.40
EMS T 2114 H	2851	656	1967	0.40
EMS T 2116 H	3258	759	2248	0.40
EMS T 2118 H	3665	843	2529	0.40

EMS T 21E0 H	44	10	30	0.50
EMS T 21E1 H	85	20	59	0.30
EMS T 2101 H	170	39	117	0.30
EMS T 2102 H	340	78	234	0.30
EMS T 2103 H	510	117	352	0.30
EMS T 2104 H	68	0156	469	0.30
EMS T 2106 H	1020	234	703	0.30
EMS T 2108 H	1359	313	938	0.30
EMS T 2110 H	1699	391	1172	0.30
EMS T 2112 H	2039	469	1407	0.30
EMS T 2114 H	2379	547	1641	0.30
EMS T 2116 H	2719	625	1876	0.30
EMS T 2118 H	3059	703	2110	0.30

EMS T 21E0 H	39	9.1	27	0.50
EMS T 21E1 H	76	17.5	52	0.30
EMS T 2101 H	152	34.9	105	0.30
EMS T 2102 H	304	69.9	210	0.30
EMS T 2103 H	456	104.8	315	0.30
EMS T 2104 H	608	139.8	419	0.30
EMS T 2106 H	912	209.7	629	0.30
EMS T 2108 H	1216	279.6	839	0.30
EMS T 2110 H	1519	249.5	1048	0.30
EMS T 2112 H	1823	419.4	1258	0.30
EMS T 2114 H	2127	489.3	1468	0.30
EMS T 2116 H	2431	559.2	1677	0.30
EMS T 2118 H	2735	629.0	1887	0.30

### EMS Stabilisers (200/115 Volt Range)

#### R18

+/-18%

Output	Kva@115V	Kva@200V	Correction
Current	1 P	3 P	Time (sec)

EMS 21E0 L	54	6.2	10	0.70
EMS 21E1 L	155	18	53	0.40
EMS 2101 L	370	42	127	0.40
EMS 2102 L	739	85	255	0.40
EMS 2103 L	1109	127	382	0.40
EMS 2104 L	1478	170	510	0.40
EMS 2106 L	2217	255	765	0.40
EMS 2108 L	2956	340	1020	0.40
EMS 2110 L	3695	425	1275	0.40
EMS 2112 L	4434	510	1530	0.40
EMS 2114 L	5173	595	1785	0.40
EMS 2116 L	5912	680	2040	0.40
EMS 2118 L	6652	765	2295	0.40

#### R20

+/-20%

Output	Kva@115V	Kva@200V	Correction
Current	1 P	3 P	Time (sec)

EMS 21E0 L	47	5.4	16	0.70
EMS 21E1 L	136	16	47	0.40
EMS 2101 L	324	37	112	0.40
EMS 2102 L	648	74	223	0.40
EMS 2103 L	972	112	335	0.40
EMS 2104 L	1295	149	447	0.40
EMS 2106 L	1943	223	670	0.40
EMS 2108 L	2591	298	894	0.40
EMS 2110 L	3239	372	1117	0.40
EMS 2112 L	3886	447	1341	0.40
EMS 2114 L	4534	521	1564	0.40
EMS 2116 L	5182	596	1788	0.40
EMS 2118 L	5830	670	2011	0.40

#### R23

+/-23%

Output	Kva@115V	Kva@200V	Correction
Current	1 P	3 P	Time (sec)

EMS 21E0 L	39	4.5	14	0.50
EMS 21E1 L	113	13	39	0.30
EMS 2101 L	270	31	93	0.30
EMS 2102 L	541	62	186	0.30
EMS 2103 L	811	93	280	0.30
EMS 2104 L	1081	124	373	0.30
EMS 2106 L	1622	186	559	0.30
EMS 2108 L	2162	249	746	0.30
EMS 2110 L	2703	311	932	0.30
EMS 2112 L	3243	373	1119	0.30
EMS 2114 L	3784	435	1305	0.30
EMS 2116 L	4324	497	1492	0.30
EMS 2118 L	4865	559	1678	0.30

#### R25

+/-25%

Output	Kva@115V	Kva@200V	Correction
Current	1 P	3 P	Time (sec)

EMS 21E0 L	35	4.0	12	0.50
EMS 21E1 L	101	11.6	35	0.30
EMS 2101 L	242	27.8	83	0.30
EMS 2102 L	483	55.6	167	0.30
EMS 2103 L	725	83.4	250	0.30
EMS 2104 L	967	111.2	333	0.30
EMS 2106 L	1450	166.7	500	0.30
EMS 2108 L	1933	222.3	667	0.30
EMS 2110 L	2417	277.9	834	0.30
EMS 2112 L	2900	333.5	1000	0.30
EMS 2114 L	3383	389.1	1167	0.30
EMS 2116 L	3867	444.7	1334	0.30
EMS 2118 L	4350	500.2	1501	0.30

#### Turbo

EMS T 21E0 L	80	9.3	28	0.70
EMS T 21E1 L	232	27	80	0.40
EMS T 2101 L	554	64	191	0.40
EMS T 2102 L	1109	127	382	0.40
EMS T 2103 L	1663	191	574	0.40
EMS T 2104 L	2217	255	765	0.40
EMS T 2106 L	3326	382	1147	0.40
EMS T 2108 L	4434	510	1530	0.40
EMS T 2110 L	5543	637	1912	0.40
EMS T 2112 L	6652	765	2295	0.40
EMS T 2114 L	7760	892	2677	0.40
EMS T 2116 L	8869	1020	3060	0.40
EMS T 2118 L	9977	1147	3442	0.40

EMS T 21E0 L	71	8.1	24	0.70
EMS T 21E1 L	204	23	70	0.40
EMS T 2101 L	486	56	168	0.40
EMS T 2102 L	972	112	335	0.40
EMS T 2103 L	1457	168	503	0.40
EMS T 2104 L	1943	223	670	0.40
EMS T 2106 L	2915	335	1006	0.40
EMS T 2108 L	3886	447	1341	0.40
EMS T 2110 L	4858	559	1676	0.40
EMS T 2112 L	5830	670	2011	0.40
EMS T 2114 L	6801	782	2346	0.40
EMS T 2116 L	7773	894	2682	0.40
EMS T 2118 L	8744	1006	3017	0.40

EMS T 21E0 L	59	6.8	20	0.50
EMS T 21E1 L	170	20	59	0.30
EMS T 2101 L	405	47	140	0.30
EMS T 2102 L	811	93	280	0.30
EMS T 2103 L	1216	140	420	0.30
EMS T 2104 L				



# EM/EMS AC Voltage Stabilisers -Dimensions

Allow 90mm  
for Eyebolts  
on height

## EM STABILISERS (400/230 VOLT RANGE)

			1PH				3PH				
			Width	Depth	Height	Weight	Width	Depth	Height	Weight	
EM	2	H	395	245	213	27	450	255	550	79	
EM	2R	H	482	310	222	29					
EM	3	H	295	420	395	60	285	580	915	158	
EM	3R	H	482	405	311	62					
EM	3.5	H	295	420	395	75	285	580	915	192	
EM	3.5R	H	482	405	311	77					
EM	4	H	320	550	360	76	335	615	1215	232	
EM	5	H	395	670	395	101	395	800	1325	310	
EM	6	H	505	1045	1140	222	1355	1045	1140	665	
EM	7	H	505	1045	1140	291	1355	1045	1140	926	
EM	8	H	505	850	1600	434	1355	850	1600	1310	
EM	9	H	505	850	1600	519	1355	850	1600	1448	
EM	11	H	505	850	1985	1000	1355	850	1985	2320	
EM	13	H	s.o.a.	s.o.a.	s.o.a.	s.o.a.	s.o.a.	s.o.a.	s.o.a.	s.o.a.	
EM	14	H	s.o.a.	s.o.a.	s.o.a.	s.o.a.	s.o.a.	s.o.a.	s.o.a.	s.o.a.	
EM	16	H	s.o.a.	s.o.a.	s.o.a.	s.o.a.	s.o.a.	s.o.a.	s.o.a.	s.o.a.	
EM	18	H	s.o.a.	s.o.a.	s.o.a.	s.o.a.	s.o.a.	s.o.a.	s.o.a.	s.o.a.	
EM	22	H	s.o.a.	s.o.a.	s.o.a.	s.o.a.	s.o.a.	s.o.a.	s.o.a.	s.o.a.	
Turbo											
EM	T	3.5	H	385	670	385	80	415	630	1010	208
EM	T	5	H	450	955	555	165	520	935	1380	385
EM	T	6	H	505	1045	1140	235	1355	1045	1140	710
EM	T	7	H	505	1045	1140	305	1355	1045	1140	990
EM	T	8	H	505	950	1600	455	1355	950	1600	1400
EM	T	9	H	505	950	1600	545	1355	950	1600	1540
EM	T	11	H	505	950	1985	1070	1355	950	1985	2480
EM	T	13	H	s.o.a.	s.o.a.	s.o.a.	s.o.a.	s.o.a.	s.o.a.	s.o.a.	s.o.a.
EM	T	14	H	s.o.a.	s.o.a.	s.o.a.	s.o.a.	s.o.a.	s.o.a.	s.o.a.	s.o.a.
EM	T	16	H	s.o.a.	s.o.a.	s.o.a.	s.o.a.	s.o.a.	s.o.a.	s.o.a.	s.o.a.
EM	T	18	H	s.o.a.	s.o.a.	s.o.a.	s.o.a.	s.o.a.	s.o.a.	s.o.a.	s.o.a.
EM	T	22	H	s.o.a.	s.o.a.	s.o.a.	s.o.a.	s.o.a.	s.o.a.	s.o.a.	s.o.a.

## EM STABILISERS (200/115 VOLT RANGE)

			1PH				3PH				
			Width	Depth	Height	Weight	Width	Depth	Height	Weight	
EM	2	L	395	245	213	27	450	255	550	79	
EM	2R	L	482	310	222	29					
EM	3	L	295	420	395	75	285	580	915	158	
EM	3R	L	482	405	311	62					
EM	3.5	L	320	550	360	75	335	615	1215	206	
EM	3.5R	L	482	600	311	77					
EM	4	L	320	550	360	77	335	615	1215	232	
EM	5	L	385	670	385	101	395	800	1325	330	
EM	6	L	505	1045	1140	222	1355	1045	1140	665	
EM	7	L	505	1045	1140	291	1355	1045	1140	926	
EM	8	L	505	850	1600	434	1355	850	1600	1310	
EM	9	L	505	850	1600	519	1355	850	1600	1448	
EM	11	L	505	850	1985	1000	1355	850	1985	2320	
EM	13	L	s.o.a.	s.o.a.	s.o.a.	s.o.a.	s.o.a.	s.o.a.	s.o.a.	s.o.a.	
EM	14	L	s.o.a.	s.o.a.	s.o.a.	s.o.a.	s.o.a.	s.o.a.	s.o.a.	s.o.a.	
EM	16	L	s.o.a.	s.o.a.	s.o.a.	s.o.a.	s.o.a.	s.o.a.	s.o.a.	s.o.a.	
EM	18	L	s.o.a.	s.o.a.	s.o.a.	s.o.a.	s.o.a.	s.o.a.	s.o.a.	s.o.a.	
EM	22	L	s.o.a.	s.o.a.	s.o.a.	s.o.a.	s.o.a.	s.o.a.	s.o.a.	s.o.a.	
Turbo											
EM	T	3.5	L	385	670	385	80	415	630	1010	220
EM	T	5	L	450	955	555	165	520	935	1380	385
EM	T	6	L	505	1045	1140	235	1355	1045	1140	710
EM	T	7	L	505	1045	1140	305	1355	1045	1140	990
EM	T	8	L	505	950	1600	455	1355	950	1600	1400
EM	T	9	L	505	950	1600	545	1355	950	1600	1540
EM	T	11	L	505	950	1985	1070	1355	950	1985	2480
EM	T	13	L	s.o.a.	s.o.a.	s.o.a.	s.o.a.	s.o.a.	s.o.a.	s.o.a.	s.o.a.
EM	T	14	L	s.o.a.	s.o.a.	s.o.a.	s.o.a.	s.o.a.	s.o.a.	s.o.a.	s.o.a.
EM	T	16	L	s.o.a.	s.o.a.	s.o.a.	s.o.a.	s.o.a.	s.o.a.	s.o.a.	s.o.a.
EM	T	18	L	s.o.a.	s.o.a.	s.o.a.	s.o.a.	s.o.a.	s.o.a.	s.o.a.	s.o.a.
EM	T	22	L	s.o.a.	s.o.a.	s.o.a.	s.o.a.	s.o.a.	s.o.a.	s.o.a.	s.o.a.

**EMS STABILISERS (400/230 VOLT RANGE)**

				1PH				3PH			
				Width	Depth	Height	Weight	Width	Depth	Height	Weight
EMS		21E0	H	295	420	395	70	415	630	1010	232
EMS		21E1	H	385	670	385	75	415	630	1010	290
EMS		2101	H	475	765	430	160	565	1025	1605	585
EMS		2102	H	580	1150	815	260	1200	1150	1605	880
EMS		2103	H	565	1025	1605	500	1400	1025	1605	1450
EMS		2104	H	565	1150	1640	593	1705	1150	1640	1780
EMS		2106	H	565	1150	2000	900	1755	1150	2000	2700
EMS		2108	H	1050	1150	1700	1150	3 x 1050	1150	1700	3 x 1150
EMS		2110	H	s.o.a.	s.o.a.	s.o.a.	s.o.a.	s.o.a.	s.o.a.	s.o.a.	s.o.a.
EMS		2112	H	s.o.a.	s.o.a.	s.o.a.	s.o.a.	s.o.a.	s.o.a.	s.o.a.	s.o.a.
EMS		2114	H	s.o.a.	s.o.a.	s.o.a.	s.o.a.	s.o.a.	s.o.a.	s.o.a.	s.o.a.
EMS		2116	H	s.o.a.	s.o.a.	s.o.a.	s.o.a.	s.o.a.	s.o.a.	s.o.a.	s.o.a.
EMS		2118	H	s.o.a.	s.o.a.	s.o.a.	s.o.a.	s.o.a.	s.o.a.	s.o.a.	s.o.a.
Turbo											
EMS	T	21E0	H	385	670	385	80	415	630	1010	237
EMS	T	21E1	H	385	670	385	100	415	630	1010	290
EMS	T	2101	H	580	1025	685	165	565	1025	1605	585
EMS	T	2102	H	565	1150	815	235	1200	1150	1605	880
EMS	T	2103	H	565	1150	1605	500	1400	1025	1605	1450
EMS	T	2104	H	565	1150	1640	593	1705	1150	1640	1780
EMS	T	2106	H	565	1150	2000	900	1755	1150	2000	2700
EMS	T	2108	H	1050	1150	1700	1150	3 x 1050	1150	1700	3 x 1150
EMS	T	2110	H	s.o.a.	s.o.a.	s.o.a.	s.o.a.	s.o.a.	s.o.a.	s.o.a.	s.o.a.
EMS	T	2112	H	s.o.a.	s.o.a.	s.o.a.	s.o.a.	s.o.a.	s.o.a.	s.o.a.	s.o.a.
EMS	T	2114	H	s.o.a.	s.o.a.	s.o.a.	s.o.a.	s.o.a.	s.o.a.	s.o.a.	s.o.a.
EMS	T	2116	H	s.o.a.	s.o.a.	s.o.a.	s.o.a.	s.o.a.	s.o.a.	s.o.a.	s.o.a.
EMS	T	2118	H	s.o.a.	s.o.a.	s.o.a.	s.o.a.	s.o.a.	s.o.a.	s.o.a.	s.o.a.

**EMS STABILISERS (200/115 VOLT RANGE)**

				1PH				3PH			
				Width	Depth	Height	Weight	Width	Depth	Height	Weight
EMS		21E0	L	395	670	385	80	415	630	1010	237
EMS		21E1	L	395	670	385	95	415	630	1010	290
EMS		2101	L	475	765	430	130	565	1025	1605	585
EMS		2102	L	565	1150	1125	240	1400	1025	1605	880
EMS		2103	L	565	1150	1605	500	1400	1025	1605	1450
EMS		2104	L	565	1150	1640	593	1705	1150	1640	1780
EMS		2106	L	s.o.a.	s.o.a.	s.o.a.	s.o.a.	s.o.a.	s.o.a.	s.o.a.	s.o.a.
EMS		2108	L	s.o.a.	s.o.a.	s.o.a.	s.o.a.	s.o.a.	s.o.a.	s.o.a.	s.o.a.
EMS		2110	L	s.o.a.	s.o.a.	s.o.a.	s.o.a.	s.o.a.	s.o.a.	s.o.a.	s.o.a.
EMS		2112	L	s.o.a.	s.o.a.	s.o.a.	s.o.a.	s.o.a.	s.o.a.	s.o.a.	s.o.a.
EMS		2114	L	s.o.a.	s.o.a.	s.o.a.	s.o.a.	s.o.a.	s.o.a.	s.o.a.	s.o.a.
EMS		2116	L	s.o.a.	s.o.a.	s.o.a.	s.o.a.	s.o.a.	s.o.a.	s.o.a.	s.o.a.
EMS		2118	L	s.o.a.	s.o.a.	s.o.a.	s.o.a.	s.o.a.	s.o.a.	s.o.a.	s.o.a.
Turbo											
EMS	T	21E0	L	385	670	385	80	415	630	1010	237
EMS	T	21E1	L	385	670	385	101	415	630	1010	290
EMS	T	2101	L	580	1025	685	200	565	1025	1605	585
EMS	T	2102	L	565	1150	1125	245	1400	1025	1605	880
EMS	T	2103	L	565	1150	1605	483	1400	1025	1605	1450
EMS	T	2104	L	565	1150	1640	593	1705	1150	1640	1780
EMS	T	2106	L	s.o.a.	s.o.a.	s.o.a.	s.o.a.	s.o.a.	s.o.a.	s.o.a.	s.o.a.
EMS	T	2108	L	s.o.a.	s.o.a.	s.o.a.	s.o.a.	s.o.a.	s.o.a.	s.o.a.	s.o.a.
EMS	T	2110	L	s.o.a.	s.o.a.	s.o.a.	s.o.a.	s.o.a.	s.o.a.	s.o.a.	s.o.a.
EMS	T	2112	L	s.o.a.	s.o.a.	s.o.a.	s.o.a.	s.o.a.	s.o.a.	s.o.a.	s.o.a.
EMS	T	2114	L	s.o.a.	s.o.a.	s.o.a.	s.o.a.	s.o.a.	s.o.a.	s.o.a.	s.o.a.
EMS	T	2116	L	s.o.a.	s.o.a.	s.o.a.	s.o.a.	s.o.a.	s.o.a.	s.o.a.	s.o.a.
EMS	T	2118	L	s.o.a.	s.o.a.	s.o.a.	s.o.a.	s.o.a.	s.o.a.	s.o.a.	s.o.a.

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