



**STATIC DIGITAL VOLTAGE REGULATION**  
highly efficient with exceptionally ultra fast speed of response – ideal for highly sensitive / mission critical loads and applications.

**FEATURES**

- **Automatic Voltage Regulation**  
Digitally controlled voltage stabilisation
- **Wide Range of Power Ratings**  
Three Phase 6 to over 400 kVA
- **Choice of Input Voltage Swing Ranges**  
Input Swing -  $\pm 15\%$  (S15),  $\pm 20\%$  (S20),  $\pm 25\%$  (S25),  $\pm 30\%$  (S30),  $\pm 35\%$  (S35),  $\pm 40\%$  (S40),  $\pm 45\%$  (S45),  $\pm 50\%$  (S50) or  $\pm 60\%$  (S60) - customer to specify.
- **Precise Output Voltage Regulation**  
Output Voltage Accuracy  $\pm 3\%$  ( $\pm 1\%$  to  $\pm 5\%$ )
- **Transient Voltage Surge Suppression**  
TVSS - Protects loads against harmful high-energy surges, transients and spikes.
- **Solid State Design**  
Electronic static design with no moving parts, delivering a virtually 'Maintenance Free' solution.

## STATIC ELECTRONIC DIGITAL DESIGN

# AC VOLTAGE STABILISERS & REGULATORS

## AC THREE PHASE - 6 TO 400 kVA

380/220V - 400/230V - 415/240V - 50 or 60Hz

X4680 MODELS: 440/256V - 460/265V - 480/277V - 600/346V - 50 or 60Hz

**ESR**  
H SERIES  
**THREE PHASE**  
4 WIRE - WITH NEUTRAL

**ENSURING AN EXTREMELY STABLE AC MAINS SUPPLY VOLTAGE**

Suitable for most types of electrical and electronic equipment, VSi's ESR Electronic AC Voltage Stabilisers continuously monitor the incoming supply. Should the incoming voltage rise or drop, the Stabilisers will automatically control the output to ensure the voltage reaching the load equipment always remains constant at the requisite voltage.

Inbuilt spike protection ensures the load is continuously protected against harmful mains born high energy spikes and surges.

**Feature Rich VSi ESR Series AC Voltage Stabilisers offer -**

- **Ultra Fast Speed of Response**  
Compact in size and quiet in operation, ESR Series AC Voltage Stabilisers deliver an unsurpassable speed of response making them ideal for highly sensitive loads.
- **Static / Solid State Design**  
ESR Series AC Voltage Stabilisers use solid state devices (SCRs) to select transformer taps to regulate the output. Unlike other similar solutions, ESR Stabilisers by nature of their design do not require the SCRs to carry the full load, just a fraction - thereby delivering far superior reliability to similar systems found on the market. With no moving parts, they are virtually 'Maintenance Free' solutions.
- **Automatic Electronic Bypass**  
Inbuilt as standard on all models, the automatic bypass maintains power to the load and unit functionality, except regulation, in the event of a problem.
- **All Digital Controls**  
All digital microprocessor control and operation ensures ESR AC Voltage Stabilisers provide the highest level of performance and accuracy. The standard LCD display provides information on the operational status and loading on the stabilizer, and enables the configuration of a number system parameters for more demanding applications where customization is required.

- **Independent Phase Control** Independent phase voltage sensing and control to ensure the individual phase voltages remain stable - regardless of load unbalance .
- **Inbuilt High Overload Capability** Ideal for loads with an inherent initial high current draw on start up.
- **Over / Low Voltage Protection** Ability to automatically shutdown the Voltage Stabiliser in the event of the input supply voltage going outside pre-set input voltage parameters.
- **Phase Failure Protection** Protection of the load in the event of phase failure.
- **SPD Class II Surge Arrestors** Protection against extremely high voltage surges and transients caused by lightning induced strikes on the utility supply line.
- **Automatic Bypass Protection** Fully automatic transfer to bypass in the event of a problem.
- **Input & Output Protection with Manual Bypass** Input Switch with Output Isolation and Manual Bypass facility, including mechanical interlocking to prevent inadvertent mis-operation.
- **Digital LCD Monitoring Panel & RS/485 Interface** Displaying real time operational status, key system readings and alarm events with RS/485 Interface ability for remote monitoring.
- **Optional Accessories** Input Isolation, IP54 / NEMA 3 Style Outdoor Enclosures & alternative Switching Arrangements.
- **Compliance with International Standards** Designed, manufactured and supplied to comply with leading international standards.

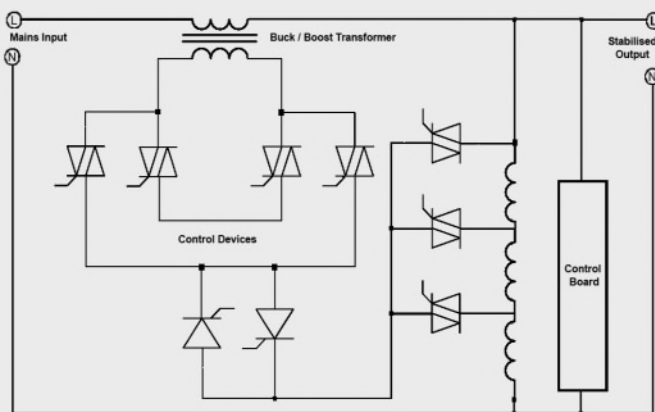


## DIGITAL BUCK BOOST SCR DESIGN TOPOLOGY

Based on the extremely well proven Buck Boost design topology, ESR Static Voltage Regulators utilise SCRs (Silicon Controlled Rectifiers) to select transformer taps to deliver a highly stable output voltage with an extremely fast correction time.

Unlike traditional Electronic SCR based solutions, the underlying Buck Boost topology ensures that the SCRs are not required to handle the full load current, but merely a fraction of the load current. By suitably sizing the ratings of the SCRs, ESR Stabilisers are able to deliver impressive over-load capabilities and considerable enhanced reliability.

The utilisation of the latest in microprocessor control and the inclusion as standard on all models of an input circuit breaker, ensures that the SCRs are fully protected against over-current conditions and other malfunctions, which historically have been viewed as the primary weakness of Electronic based SCR solutions.



## VOLTAGE CHOICES AVAILABLE

Also available as 3 Wire Solutions (No Neutral)  
- ESR-HD-3P & ESR-LD-3P SERIES

### 4 WIRE SOLUTIONS

THREE PHASE WITH NEUTRAL (+ GROUND / EARTH)

#### H SERIES 6 to 3125 kVA



#### High Voltage Models:

380/220V, 400/230V or 415/240V

X4680 Models - 440/254V, 460/265V, 480/277V or 600/346V  
Other voltages available on individual request / quotation.

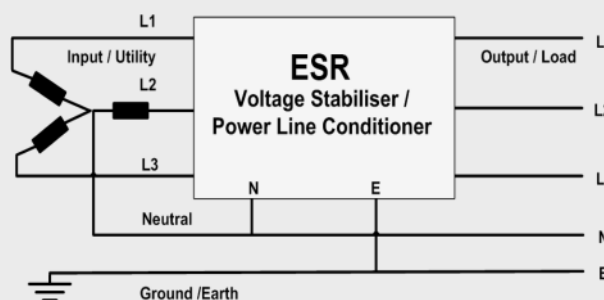
#### LY SERIES 6 to 500 kVA



#### Low Voltage Models:

190/110V, 200/115V, 208/120V or 220/127V

Other voltages available on individual request / quotation.



## INPUT VOLTAGE WINDOWS OPTIONS (S\*)

### H SERIES - ESR-H-3P-S\* Input Voltage Windows Options (380V to 415V Models)

Nominal Three Phase Voltage	INPUT VOLTAGE SWINGS / SWING MODEL NO S* VARIANTS							
	S15		S20		S25		S30	
	L-L	L-N	L-L	L-N	L-L	L-N	L-L	L-N
<b>380V</b> L-N: 220V	323 to 437V (± 15%)	187 to 253V	304 to 456V (± 20%)	176 to 264V	285 to 475V (± 25%)	165 to 275V	266 to 494V (± 30%)	154 to 286V
<b>400V</b> L-N: 230V	340 to 460V (± 15%)	196 to 265V	320 to 480V (± 20%)	184 to 276V	300 to 500V (± 25%)	173 to 288V	280 to 520V (± 30%)	161 to 299V
<b>415V</b> L-N: 240V	353 to 477V (± 15%)	204 to 276V	332 to 498V (± 20%)	192 to 288V	311 to 519V (± 25%)	180 to 300V	291 to 540V (± 30%)	168 to 312V

Nominal Three Phase Voltage	INPUT VOLTAGE SWINGS / SWING MODEL NO S* VARIANTS									
	S35		S40		S45		S50		S60	
	L-L	L-N	L-L	L-N	L-L	L-N	L-L	L-N	L-L	L-N
<b>380V</b> L-N: 220V	247 to 513V (± 35%)	143 to 297V	228 to 532V (± 40%)	132 to 308V	209 to 551V (± 45%)	121 to 319V	190 to 570V (± 50%)	110 to 330V	152 to 608V (± 60%)	88 to 352V
<b>400V</b> L-N: 230V	260 to 540V (± 35%)	150 to 311V	240 to 560V (± 40%)	138 to 322V	220 to 580V (± 45%)	127 to 333V	200 to 600V (± 50%)	115 to 345V (± 50%)	160 to 640V (± 60%)	92 to 368V
<b>415V</b> L-N: 240V	270 to 560V (± 35%)	156 to 324V	249 to 581V (± 40%)	144 to 336V	229 to 601V (± 45%)	132 to 348V	208 to 622V (± 50%)	120 to 360V	166 to 664V (± 60%)	96 to 384V

Also available with Similar Input Voltage Swings for X440 (440V), X460 (460V), X480 (480V) & X600 (600V) Models.



## DESIGNED FOR TODAY'S MODERN NEEDS

Voltage Regulators are designed to stabilize the voltage when it fluctuates, up or down.

They are essential whenever reliable power is needed or when normal operation of electrical or electronic equipment is disrupted by voltage variations.

In general when suppliers of today's modern electrical and electronic equipment design their products they do so knowing that most electrical utilities around the world cannot provide or promise better than a  $\pm 5\%$  output voltage accuracy of nominal and as such they design their equipment so it is able to operate efficiently within this range.

ESR Stabilisers are specifically designed to meet the requirements of today's modern loads, being feature rich and virtually maintenance free static mains control solutions.

They ensure the availability of a constant voltage at a level that always meets the design requirements of the load equipment, even for the most challenging of power environments or site loads.

Configured for optimal energy efficiency and design life expectancy, **ESR** stabilisers are supplied by default with the output voltage accuracy set for  $\pm 3\%$ , being easily site-adjustable to deliver a more or less precise output voltage accuracy - as considered most appropriate for a particular site's needs.



## PRODUCT SELECTION TABLE

**S\*** = Selected permissible input voltage window - **S15** ( $\pm 15\%$ ), **S20** ( $\pm 20\%$ ), **S25** ( $\pm 25\%$ ), **S30** ( $\pm 30\%$ ), **S35** ( $\pm 35\%$ ), **S40** ( $\pm 40\%$ ), **S45** ( $\pm 45\%$ ), **S50** ( $\pm 50\%$ ) or **S60** ( $\pm 60\%$ )

ESR Models	Rating	Max Rating (Amps per Phase)							Dimensions W x H x D (mm)	Weights Kg
		H SERIES			H-X468 SERIES					
	kVA	@ 380V	@ 400V	@ 415V	@ 440V (X440)	@ 460V (X460)	@ 480V (X480)	@ 600V (X600)		
ESR-6H-3P-T1F-S*	6	9.1	8.7	8.3	7.9	7.5	7.2	5.8		
ESR-10H-3P-T1F-S*	10	15.2	14.4	13.9	13.1	12.5	12.0	9.6		
ESR-15H-3P-T1F-S*	15	22.8	21.6	20.9	19.7	18.8	18.0	14.4		
ESR-20H-3P-T1F-S*	20	30	28	27	26	25	24	19		
ESR-25H-3P-T1F-S*	25	38	36	34	32	31	30	24		
ESR-30H-3P-T1F-S*	30	45	43	41	39	37	36	28		
ESR-35H-3P-T1F-S*	35	53	50	48	45	43	42	33		
ESR-40H-3P-T1F-S*	40	60	57	55	52	50	48	38		
ESR-45H-3P-T1F-S*	45	68	64	62	59	56	54	43		
ESR-50H-3P-T1F-S*	50	75	72	69	65	62	60	48		
ESR-55H-3P-T1F-S*	55	83	79	76	72	69	66	52		
ESR-60H-3P-T1F-S*	60	91	86	83	78	75	72	57		
ESR-75H-3P-T1F-S*	75	113	108	104	98	94	90	72		
ESR-80H-3P-T1F-S*	80	121	115	111	104	100	96	77		
ESR-90H-3P-T1F-S*	90	136	129	125	118	112	108	86		
ESR-100H-3P-T1F-S*	100	151	144	139	131	125	120	96		
ESR-120H-3P-T1F-S*	120	182	173	166	157	150	144	115		
ESR-150H-3P-T1F-S*	150	227	216	208	196	188	180	144		
ESR-180H-3P-T1F-S*	180	273	259	250	236	225	216	173		
ESR-200H-3P-T1F-S*	200	303	288	278	262	251	240	192		
ESR-250H-3P-T1F-S*	250	379	360	347	327	313	300	240		
ESR-300H-3P-T1F-S*	300	455	432	417	393	376	360	288		
ESR-350H-3P-T1F-S*	350	531	505	486	459	439	420	336		
ESR-400H-3P-T1F-S*	400	607	577	556	524	501	481	384		

Dimensions & Weights are dependent on Swing Model Variant selected (S15 to S60)  
Sizings and Weights available on individual request.

Note: Optional Accessories added may affect dimensions - subject to confirmation.



## TECHNICAL SPECIFICATION

<b>Technology:</b>	Digital Buck Boost SCR design topology		
<b>Input Voltage Swing Variant Options Available: (S*)</b>	<b>Model</b>	<b>Input Swing</b>	<b>Output Accuracy</b>
			Default Available
	<b>S15</b>	± 15%	± 3% ±1% to ±5%
	<b>S20</b>	± 20%	± 3% ±1% to ±5%
	<b>S25</b>	± 25%	± 3% ±3% to ±5%
	<b>S30</b>	± 30%	± 3% ±3% to ±5%
	<b>S35</b>	± 35%	± 5% ±3% to ±5%
	<b>S40</b>	± 40%	± 5% ±3% to ±5%
	<b>S45</b>	± 45%	± 5% ±5% to ±10%
	<b>S50</b>	± 50%	± 5% ±3% to ±5%
<b>S60</b>	± 60%	± 5% ±5% to ±10%	
	<b>Three Phase, 4 Wire ( 3 Phase + Neutral + G/E).</b> Other swing options available to special quotation / order.		
<b>Output Voltage:</b>	380/220V, 400/230V & 415/240V ( <i>Customer to specify</i> ), Three Phase, 4 Wire.  <b>X4680 Models</b> - 440/254V (X440), 460/265V (X460), 480/277V (X480) & 600/346V (X600) - available on request.  The permissible input voltage swing is relative to the preset output voltage.		
<b>Output Voltage Accuracy:</b>	± 3% ( <i>Default</i> ) - adjustable from ± 1% to ±5%, ( <i>dependent on input swing - see above</i> ).		
<b>Frequency:</b>	35 - 63Hz		
<b>Correction Time:</b>	Within 60 milliseconds (3 to 4 Cycles) per Step		
<b>Efficiency:</b>	≥98%		
<b>Power Factor:</b>	The Power Factor has no effect on performance providing the stabiliser is being used within its rated capacity		
<b>Overload Capability:</b>	5 x max. current rating for 1 second 3 x max. current rating for 2 minutes 1.5 x max. current rating for 10 minutes		
<b>Surge Suppression:</b>	TVSS - Protects loads against high-energy Spikes and Transient Voltages.		
<b>Harmonic Distortion:</b>	None introduced		
<b>Independent Phase Control:</b>	Maintains each phase voltage stable irrespective of load unbalance, even up to 100% load unbalance.		
<b>Automatic Bypass:</b>	Automatic transfer to bypass in the event of an overload or system problem.		
<b>Start Up Protection:</b>	Protection of the load equipment from damaging start up voltage surges.		
<b>Environment:</b>	Temperature range 0 to 45 °C. Derate by 2% for each additional °C Up to max 60 °C . Suitable for indoor tropical use 90% RH (non-condensing). Maximum altitude 4000m. Derate by 2.5% for each additional 500m.		
<b>Audible Noise:</b>	< 45 dB (at 1 metre)		
<b>Construction:</b>	Enclosures to IP20 (NEMA 1 Style) - BS EN 60529 (Option - Outdoor IP54 / NEMA 3)		
<b>Paint Colour:</b>	As standard RAL 1013 (Oyster White) - Epoxy Powder Coating. Other colours available as an option on specific request.		
<b>EMC Conformance:</b>	Complies with BS EN 55022 and the relevant parts of the BS EN 61000 series of standards.		
<b>CE Conformity:</b>	<b>CE Marked</b> - being fully compliant with European Union Directives 2014/30/EU (The EMC Directive) and 2014/35/EU (The Low Voltage Directive).		
<b>Standard Warranty:</b>	Two Years / 24 Months from date of supply - with extendable option to 5 Years.		

**Standard Features:**

Input Switch / Breaker with Output Isolation and Manual Bypass, Phase Failure Protection, Automatic Electronic Bypass, Class II Lightning Surge Arrestors and LCD Display Panel with RS/485 Interface

**SOLID & ROBUST CONSTRUCTION**

ESR Series Stabilisers are enclosed in robust floor standing air-cooled cubicles, being built upon a rigid framework construction and offering front door access and removable side panels for ease of installation and servicing.

Supplied as standard with bottom cable entry (*top entry to specific order*), ESR Stabilisers offer IP20 / NEMA 3 Style Ingress Protection and are supplied complete with an epoxy powder heavy duty Oyster White (RAL 1013) orange peel paint finish.



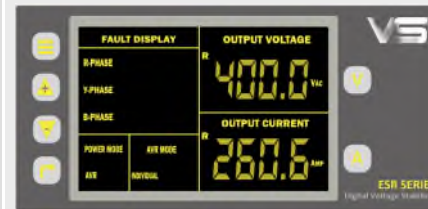
Typical Internal View

**ALSO AVAILABLE IN IP54 / NEMA 3 STYLE ENCLOSURES**

Suitable for external use, or more challenging internal environments.



**LCD DIGITAL DISPLAY PANEL**



**Comprehensive LCD Digital Monitoring and Control Panel**

delivering intuitive control and monitoring of all the key system parameters.

**Real Time Display of -**

- **Voltage:** Individual & Average Output Phase Voltages
- **Current:** Individual & Average Phase Currents
- **Operational Status:** On AVR & On Bypass
- **Alarm Conditions:** Overload, Over-Voltage, Under-Voltage, Fuse Failure & Phase Failure

**Modifiable System Parameter Settings -**

- Output Voltage
- Output Voltage Accuracy
- Correction Time
- Voltage Regulation Method
- Over - Voltage
- Under - Voltage
- Over - Current Value

**RS-485 COMMUNICATION**

All ESR Voltage Stabilisers offer as standard a RS-485 communication facility which will enable the following information to be available for remote monitoring -

**Measurements:**

- **Input Voltage:** Phase to Phase & Phase to Neutral
- **Output Voltage:** Phase to Phase & Phase to Neutral
- **Current:** Phase Currents

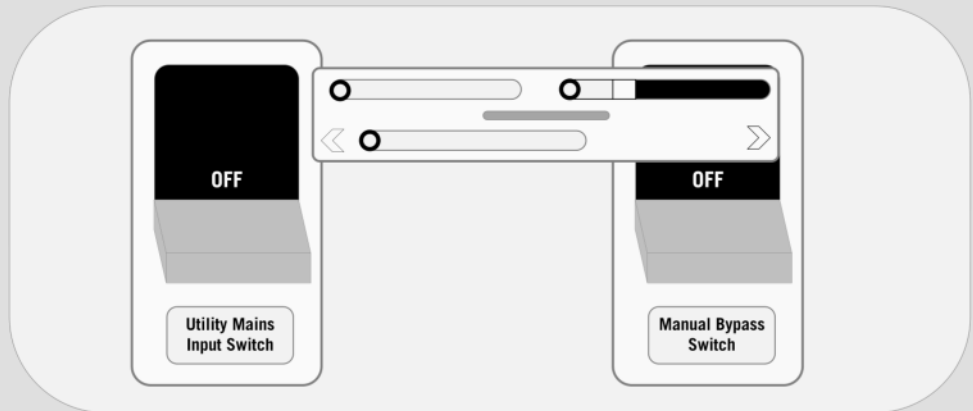
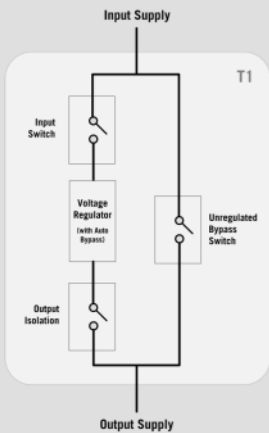
**Status Indications:**

- Over Voltage
- Under Voltage
- Current Overload
- Fuse Blown



## STANDARD SWITCH ARRANGEMENTS - TYPE T1F - Standard on models up to 400 kVA

The Type 1F style switch arrangement consists of an input breaker and manual bypass switch, with internal output isolation – as depicted below - with mechanical interlocking to prevent inadvertent mis-operation of the input & bypass breakers.



## ADD-ON OPTIONS

Where required ESR Series AC Voltage Stabilisers can be supplied with the following additional accessories / add-on features.

- Input Isolating Transformer (-PC)**

Through the integration of a shielded isolation transformer, provides enhanced spike & electrical noise (Common Mode: 120db @ 100khz & Normal Mode Noise: 60db @ 100khz) suppression and neutral ground bonding. Delivers what is commonly referred to as a 'CLEAN' supply.

- IP54 Ingress Protection (-IP54)**

Stabiliser presented in durable IP54 (BS / EN 60529) / NEMA 3 free standing steel cubicles suitable for external use, or more challenging internal environments.

- AquaStop (-AS)**

PCB protective coating offering protection against damp and moisture ingress.

- Additional Digital Metering (-ADM)**

Additional Digital Metering for Input Voltage and Frequency.

- 4 Pole Switches / Breakers (-FP)**

As standard ESR Stabilisers utilise 3 Pole Switches / Breakers. As an option 4 Pole alternatives can be supplied.

- eSpec Upgrade (-eSP)**

While we endeavour to keep production costs to a minimum by sourcing top specification components from around the globe we realise that some clients have a requirement for their own designated protection devices.

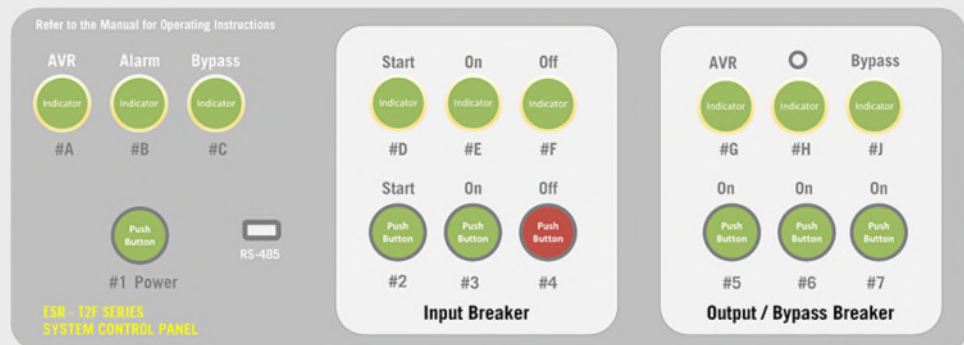
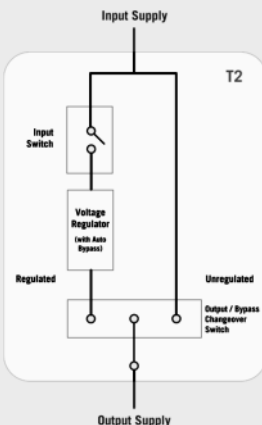
Accordingly we are able to offer our **eSpec Pack Upgrade** package which offers the client the short circuit and overcurrent protection components from their preferred leading European or American manufacturers.

- Alternative Paint Colour (-RAL)**

Alternative Paint Colour Finnish - *customer to specify.*

- Alternative Switch Arrangement (-T2F) - 200 kVA rated models and above only**

The Type 2F style switch arrangement consists of a motorised input air switch and output / bypass changeover switch – as depicted below - with full electronic interlocking to prevent inadvertent mis-operation.



T2F – Control Panel with Electronic Interlocking

**NB:** The inclusion of the above add-on options may increase enclosure sizings and weights - subject to confirmation at time of ordering.

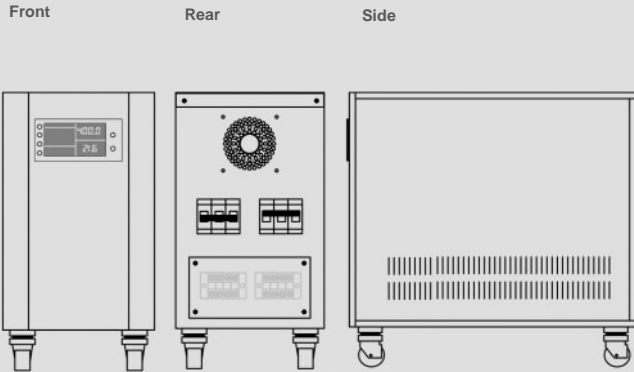


## STANDARD ENCLOSURE TYPES

ALSO available in Outdoor IP54 / NEMA 3 Style Enclosures - IP54 OPTION

### C01 to C03 Enclosures on Castors

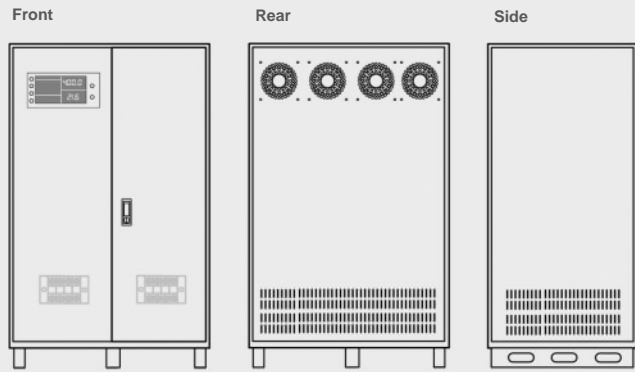
1 Side Door  
with removeable side panel



Physical Size:	Bottom Cable Entry	
<b>C01</b>	380(W) x 840(H) x 780(D) mm	15.0"(W) x 33.1"(H) x 30.8"(D) inches
<b>C02</b>	430(W) x 1170(H) x 780(D) mm	16.9"(W) x 46.1"(H) x 30.8"(D) inches
<b>C03</b>	520(W) x 1170(H) x 850(D) mm	20.5"(W) x 46.1"(H) x 33.5"(D) inches

### C04 to C06 Enclosures

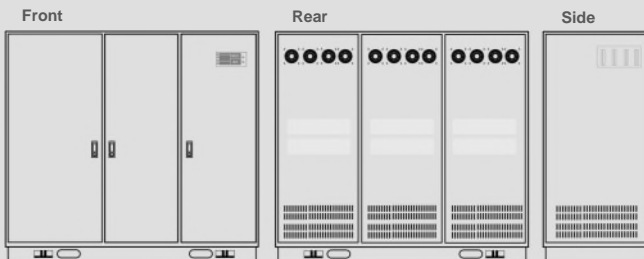
2 Front Doors  
with removeable rear & side panels



Physical Size:	Bottom Cable Entry (Option for Top Cable Entry)	
<b>C04</b>	1000(W) x 1500(H) x 700(D) mm	39.4"(W) x 59.1"(H) x 27.6"(D) inches
<b>C05</b>	1200(W) x 1600(H) x 800(D) mm	47.3"(W) x 63.0"(H) x 31.5"(D) inches
<b>C06</b>	1500(W) x 1900(H) x 1000(D) mm	59.1"(W) x 74.8"(H) x 39.4"(D) inches

### C08 Enclosure

3 Front Doors  
with removeable rear & side panels



Physical Size:	Top Cable Entry (Option for Bottom Cable Entry)	
<b>C07</b>	2800(W) x 1900(H) x 1100(D) mm	110.3"(W) x 74.8"(H) x 43.4"(D) inches

### Typical ESR-250H-3P-T1F-S20 (400V) - 250 kVA Model



## TYPICAL APPLICATIONS

- Computers & Network Systems
- Medical Equipment
- Electronics Equipment
- Testing Equipment
- Laboratory Equipment
- POS Terminals
- Process Control Systems
- TV / Radio Broadcasting Stations
- Elevators
- Audio/Video Systems
- Security Systems
- Production Line
- CNC Equipment
- SMT Equipment

## CUSTOM BUILT SOLUTIONS

Voltage Stabilisers International (VSi), with a strong and wide manufacturing base, is able to meet the requirements of customers from our own in-house professional resources.

Where bespoke / custom built solutions are required we are able to call upon our extensive portfolio of proven standard designs and tailor offerings to accommodate, without breaking the bank, most individual specific requirements.

