



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 450 to 3125 kVA
- Choice of Input Voltage Swing Ranges
 Input Swing ±15% (S15), ±20% (S20), ±25% (S25), ±30% (S30), ±35% (S35), ±40% (S40), ±45% (S45), ±07 ±50% (S50) customer to specify.
- Precise Output Voltage Regulation
 Output Voltage Accuracy ±1% to ±5%
- Transient Voltage Surge Suppression
 TVSS Protects loads against harmful high-energy surges, transients and spikes.
- Solid State Design
 Highly reliable and endurable electronic static design with no moving parts, delivering a virtually
 'Maintenance Free' voltage regulation solution.

STATIC ELECTRONIC DIGITAL DESIGN

AC VOLTAGE STABILISERS & REGULATORS

AC THREE PHASE - 450 to 3125 kVA

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

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

ESR 4 WIRE - WITH NEUTRAL

H - THREE PHASE

ENSURING AN EXTREMELY STABLE AC MAINS SUPPLY VOLTAGE

Suitable for most types of electrical and electronic equipment, the feature rich Sinalda's **ESR** Static Electronic Digital 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.

Sinalda ESR Series Static Electronic Digital 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. 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.
- 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 Transfer to internal bypass operation in the event of a problem.
- Input & Output Protection with Manual Bypass Input Switch / Breaker with Output Isolation and Manual Bypass facility, including integrated mechanical / electronic 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 Transformer, IP54 / NEMA 3 Style Outdoor Enclosures, 150% Overload capability & alternative Switching Arrangements.
- Compliance with International Standards
 Designed, manufactured and supplied to comply with leading international standards. Fully CE / UKCA compliant and labelled.

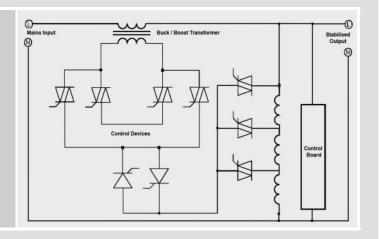


DIGITAL BUCK BOOST SCR DESIGN TOPOLOGY

Based on the extremely well proven Buck Boost design topology which underlines our SVS AC Voltage Stabilisers, 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. Where appropriate, by suitably sizing the ratings of the SCRs, ESR Stabilisers are able to deliver impressive overload 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

450 to 3125 kVA



HX Models - 440/254V, 460/265V, 480/277V or 600/346V

High Voltage Models:

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

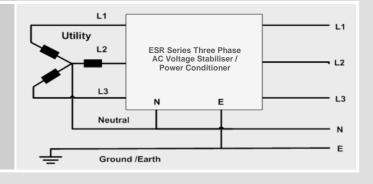
Other voltages available on individual request / quotation.

LY SERIES 450 to 500 kVA

Low Voltage Models:

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

Other voltages available on individual request / quotation.



— INPUT VOLTAGE WINDOW OPTIONS

H SERIES - ESR-H-T2F/T3F-3P-S* Input Voltage Windows Options

Other Swings available to special order / request

Nominal Three Phase Voltage	INPUT VOLTAGE SWINGS / SWING MODEL NO S* VARIANTS										
	\$15 450 to 3125 kVA		S	20	S25		S30				
			450 to 3125 kVA		450 to 2500 kVA		450 to 2000 kVA				
	L-L	L-N	L-L	L-N	L-L	L-N	L-L	L-N			
380V L-N: 220V	323 to 437V	187 to 253V	304 to 456V	176 to 264V	285 to 475V	165 to 275V	266 to 494V	154 to 286V			
	(± 15%)		(± 20%)		(± 25%)		(± 30%)				
400V L-N: 230V	340 to 460V	196 to 265V	320 to 480V	184 to 276V	300 to 500V	173 to 288V	280 to 520V	161 to 299V			
	(± 15%)		(± 20%)		(± 25%)		(± 30%)				
415V L-N: 240V	353 to 477V	204 to 276V	332 to 498V	192 to 288V	311 to 519V	180 to 300V	291 to 540V	168 to 312V			
	(± 1	(± 15%)		20%)	(± 25%)		(± 30%)				

Nominal Three Phase Voltage	INPUT VOLTAGE SWINGS / SWING MODEL NO S* VARIANTS										
Thase voltage	S35 250 to 1200 kVA		\$40 250 to 1200 kVA		S45 250 to 1200 kVA		\$50 250 to 1000 kVA				
	L-L	L-N	L-L	L-N	L-L	L-N	L-L	L-N			
380V L-N: 220V	247 to 513V	143 to 297V	228 to 532V	132 to 308V	209 to 551V	121 to 319V	190 to 570V	110 to 330V			
300 V L-N: 220V	(± 35%)		(± 40%)		(± 45%)		(± 50%)				
400V L-N: 230V	260 to 540V	150 to 311V	240 to 560V	138 to 322V	220 to 580V	127 to 333V	200 to 600V	115 to 345V			
400 V L-N: 230V	(± 35%)		(± 40%)		(± 45%)		(± 50%)				
415V L-N: 240V	270 to 560V	156 to 324V	249 to 581V	144 to 336V	229 to 601V	132 to 348V	208 to 622V	120 to 360V			
713V L-N: 240V	(± 35%)		(± 40%)		(± 45%)		(± 50%)				

Also available with Similar Input Voltage Swings for 440V, 460V, 480V & 600V Nominal Voltages (HX Models).







— DESIGNED SPECIFICALLY 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 ±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 $\pm 3\%$ ($\pm 5\%$ for S45+ Models), being easily site-adjustable to deliver a more or less precise output voltage accuracy - as considered most appropriate for a particular site's needs / available



— PRODUCT SELECTION TABLE

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

ESR Models	Output Power Capacity	Standard Switch Arrange- ment	Max Rating (Amps per Phase)							Dimensions	Weights		
	kVA		H SERIES			HX SERIES							
			@ 380V	@ 400V	@ 415V	@ 440V	@ 460V	@ 480V	@ 600V	W x H x D (mm)	Kg		
ESR-450H-3P-T2F-S*	450	T2F	683	649	625	590	564	541	432				
ESR-500H-3P-T2F-S*	500	T2F	759	721	695	655	627	601	481				
ESR-600H-3P-T2F-S*	600	T2F	911	865	834	787	752	721	577				
ESR-650H-3P-T2F-S*	650	T2F	987	937	904	852	815	781	625				
ESR-700H-3P-T2F-S*	700	T2F	1063	1010	973	918	878	841	673	Dimensions & Weights For S15 to S5 0 models available or individual request.			
ESR-750H-3P-T2F-S*	750	T2F	1139	1082	1043	983	941	901	721				
ESR-800H-3P-T2F-S*	800	T2F	1215	1154	1112	1049	1003	962	769				
ESR-900H-3P-T2F-S*	900	T2F	1367	1298	1251	1180	1129	1082	865				
ESR-1000H-3P-T2F-S*	1000	T2F	1518	1443	1390	1311	1254	1202	962				
ESR-1200H-3P-T2-S*	1200	T2F	1822	1731	1669	1574	1505	1443	1154				
ESR-1250H-3P-T2F-S*	1250	T2F	1898	1803	1738	1639	1568	1503	1202				
ESR-1500H-3P-T2F-S*	1500	T2F	2278	2164	2086	1967	1882	1803	1443				
ESR-1600H-3P-T2F-S*	1600	T2F	2430	2308	2225	2098	2007	1924	1539				
ESR-2000H-3P-T2F-S*	2000	T2F	3037	2885	2781	2623	2509	2404	1924				
ESR-2500H-3P-T3F-S*	2500	T3F	3797	3607	3477	3279	3137	3006	2404				
ESR-3000H-3P-T3F-S*	3000	T3F	4556	4328	4172	3935	3764	3607	2885				
ESR-3125H-3P-T3F-S*	3125	T3F	4746	4509	4346	4099	3921	3757	3006				

Smaller kVA and alternative voltage options available to order / individual request.

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







— TECHNICAL SPECIFICATION

Technology:	Digita	l Buck B	oost SCR	design topolo	oav					
Input Voltage Swing	Model	Available								
Variant Options Available:	modeli	Input Swing	Default	Accuracy Available	Ratings					
(S*)	S15	± 15%	± 3%	±1% to ±5%	250 to 3750 kVA					
	S20	± 20%	± 3%	±1% to ±5%	250 to 3750 kVA					
	S25	± 25%	± 3%	±3% to ±5%	250 to 2500 kVA					
	S30	± 30%	± 3%	±3% to ±5%	250 to 2000 kVA					
	S35	± 35%	± 3%	±3% to ±5%	250 to 1200 kVA					
	S40	± 40%	± 3%	±3% to ±5%	250 to 1200 kVA					
	S45	± 45%	± 5%	±5 to ±10 %	250 to 1200 kVA					
	S50	± 50%	± 5%	±5 to ±10 %	250 to 1000 kVA					
	Three Phase, 4 Wire (3 Phase + Neutral + G/E). Other swing options available to special quotation / order.									
Output Voltage:	380/220V, 400/230V & 415/240V (<i>Customer to specify</i>), Three Phase, 4 Wire. HX Models - 440/254V (<i>X440</i>), 460/265V (<i>X460</i>), 480/277V (<i>X480</i>) & 600/346V (<i>X600</i>) - available on request.									
	The permissible input voltage swing is relative to the preset output voltage.									
Output Voltage Accuracy:				able from ± 1 ing - see abov						
Frequency:	47 - 6	3Hz								
Correction Time:	Within	n 60 Millis	seconds (3 to 4 Cycles)	per Step					
Efficiency:	≥98%									
Power Factor:	The Power Factor has no effect on performance providing the stabiliser is being used within its rated capacity									
Maximum Output Current Rating:	Up to 100% (set via Digital Display Panel)									
Surge Suppression:			ts loads a Voltages.	gainst high-e	nergy Spikes					
Harmonic Distortion: None introduced										
Independent Phase Control:	Maintains each phase voltage stable irrespective of load unbalance, even up to 100% load unbalance.									
Automatic Bypass:	Automatic transfer to bypass in the event of an overload or system problem.									
Start Up Protection:	Protects load equipment from damaging start up voltage surges.									
Environment:	Environment: Temperature range 0 to 45 °C. Derate by 2% each additional °C Up to max 60 °C. Suitable indoor tropical use 90% RH (non-condensing) Maximum altitude 1000m. Derate by 2.5% for additional 500m.									
Audible Noise:	< 45 dB (at 1 metre)									
Construction:				MA 1 Style) - 'NEMA 3)	BS EN 60529					
Paint Colour:	RAL 7032 (Pebble Grey - Epoxy Powder Coating). Other colours available as an option on specific request.									
EMC Conformance:	MC Conformance: Complies with BS EN 55022 and the relevant part of the BS EN 61000 series of standards.									
CE / UKCA Conformity:										
Standard Warranty:	Two Years / 24 Months from date of supply -with extendable option to 5 Years.									
Standard Features:	Manu Auton Surge	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								

INDUCTIVE LOADS

Where the load type is inductive in nature such as motors (fans, pumps, etc), solenoids, and relays it is essential that high inrush current and short-time overload factors are fully considered. With motors (without a soft start facility) typically drawing on start-up current 5 to 7 times the stated rating of the motor it is recommended that a Static Voltage Stabiliser is selected that is 3 times the stated rated capacity of the load and that the inrush current does not exceed the listed "Maximum Output Current Rating" of the stabiliser for stabiliser with the SR50 option, if fitted.

LCD DIGITAL DISPLAY PANEL



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 Individual & Average Phase Input Currents

Operational Status: On AVR & On Bypass

Overload, Over-Voltage, Under-Voltage, SCR Fuse Failure, Phase Error, Phase Loss and SPD Fault Alarm Conditions:

Modifiable System Parameter Settings -

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

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 -

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
- Overload

- Phase Error SPD Fault
- Phase Loss
- SCR Fuse Blown

Typical SAUK Model: ESR-1000H-3P-T2F-S15 (400V)

1000kVA Three Phase Static Electronic Digital AC Voltage Stabiliser



Front View With Doors Closed



With Doors Open







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 or as standard on T3F systems). ESR Stabilisers offer IP20 / NEMA 3 Style Ingress Protection and are supplied complete with an epoxy powder heavy duty Ovster White (RAL 1013) orange peel paint finish.

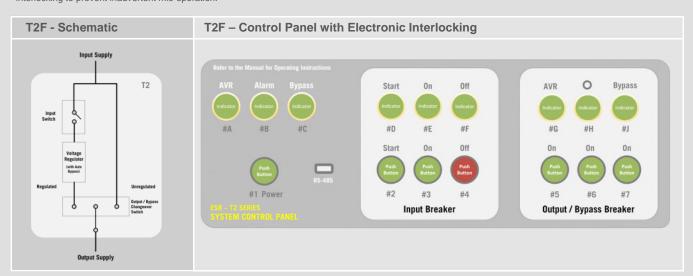


Typical Internal View - 2000 kVA Model Cubicle



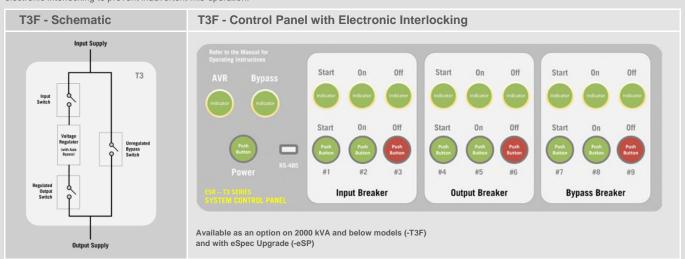
STANDARD TYPE 2F SWITCH ARRANGEMENTS - on 450 kVA to 2000 kVA Models

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.



STANDARD TYPE 3F SWITCH ARRANGEMENTS - 2500 kVA & Above Models

Similar to the Type 2F arrangement, T3F systems utilise separate motorised air output and bypass switches - as depicted below - whilst still offering full electronic interlocking to prevent inadvertent mis-operation.





UNSURPASSED TOTAL PROTECTION FEATURES

Offered with an impressive 2 Years Warranty (extendable to 5 Years), ESR Three Phase Static Electronic AC Voltage Stabilisers are widely considered to be the finest in class and incorporate as standard many advanced protection features which 'others' only deem fit to offer as expensive add-on options.



Inclusion of an **optional** screened Input Isolation
Transformer (**-PC**) enhances Transient Voltage Surge
protection and ensures defence against less prevalent
common and normal mode electrical noise – delivering
what is commonly referred to as a 'Clean Supply'.

Inbuilt STANDARD advanced protection features include:-

- Automatic input switch ensuring protection against potential faults and /or short-circuits inside the stabiliser.
- Output isolation / automatic output switch delivers protection against overload, short circuit, over voltage, under voltage and phase failure.
- In addition to the provision of an inbuilt automatic electronic bypass, all ESR stabilisers offer an integral 'Break Before Make' bypass switch, enabling the stabiliser to be segregated from the line supplying the load.
- To avoid damage to the stabiliser and load, switch interlocking prevents inadvertent mis-operation of the switches.
- SPD Class II Surge Arrestors ensure protection for the stabiliser and load against extremely high voltage surges and transients caused by atmospheric (eg. lightning induced strikes) or operational issues on the utility supply.

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 endurable IP54 (BS / EN 60529) / NE-MA 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.

Alternative Switch Arrangements (-T2F or -T3F)

Alternative Input, Output and Bypass Switching arrangements - see Switching Arrangement Section.

• 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.

Inbuilt Surge Rating (-SR50)

150% Surge Rating for up to 1 minute - Recommended for inductive load types

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



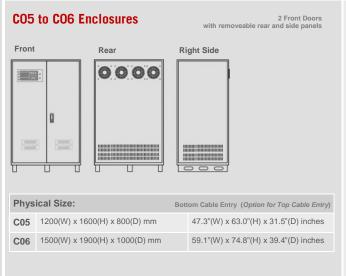
SAUK Model: ESR-2000H-3P-T2F-S20 (400V)

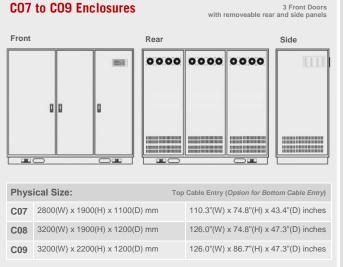
Typical T2F Style ESR 2000 kVA Series Three Phase Static Electronic AC Voltage Stabiliser



STANDARD ENCLOSURE TYPES

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





— ESR TYPICAL APPLICATIONS

- Computers & Network Systems
- Medical Equipment
- Electronics Equipment
- Testing Equipment

- Laboratory Equipment
- Process Control Systems
- TV/Radio Broadcasting Stations
- Elevators / Lifts

- Audio/Video Systems
- Production Lines
- CNC Machines
- SMT Equipment

Every Voltage Stabilization or Power Conditioning solution we offer is backed by the unrivalled experience we have gained in the world market over the last 30 years or so.

Tried, tested and extensively proven in all corners of the world, including some of the harshest and most remote power environments on this planet, our solutions can be found on duty protecting vital equipment where the supply must never be found wanting . . . not even for a single second.

Only by delivering Quality in product and service have we been able to consistently grow our client base year on year. Today we are an approved supplier to many well-known major international corporations and public organisations.

With an emphasis always on building and maintaining strategic and long-lasting relationships with our Customers, our Clients are drawn from a wide selection of industries and market sectors spread throughout the world.

APPLICATIONS IN . . .

- Africa
- Europe
- Middle East
- North America
- Central & South America
- Caribbean
- Asia
- Oceania

Want to learn more about us and the Clients we serve?

Check us out online at https://www.sinalda.com/sinalda/at-your-service/

— CUSTOM BUILT SOLUTIONS

Sinalda UK, 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.



ESR SERIES

AC Voltage Stabilisers and Power Line Conditioners are available from -

