

TECHNICAL SPECIFICATION

VARIO

VARMATIC VOLTAGE OPTIMISER™

The Varmatic Vario is a technologically advanced electromagnetic device purposely designed for voltage optimisation. Designed and manufactured in the UK, the Varmatic Vario is built using extremely low-loss silicon grain oriented steel and very high purity copper.

Introduced in 2001, the Varmatic Vario is the result of over 30 years design and manufacturing experience in the heavy electrical current industry.

Varmatic Vario units have no moving parts or components and are therefore extremely reliable and require no maintenance. Installing the Varmatic Vario does not in any way compromise or impair the normal and continued functionality of existing mechanical and electrical equipment.

The Varmatic Vario adjusts voltage by means of electromagnetic coils resulting in a percentage reduction between the input and output voltage.

The Varmatic Vario is a passive electromagnetic device under Electromagnetic compatibility (EMC) terms and the design, whilst using tried and trusted electrical principles, has unique features in the method of winding, core construction and insulating materials which when combined reduce losses, allowing it to operate at high ambient temperatures and giving it a long and trouble-free life.

The Varmatic Vario is installed after the electricity supply company meter but before the main distribution panel. All Varmatic Vario units are manufactured with a 10% continuous overload capacity for additional safety. All units have very low impedance.

The tertiary winding has been designed to act as a harmonic trap to filter the 3rd based "triplen" harmonics, aiding in the reduction of total harmonic distortion (THD) through its delta configuration which benefits overall power quality.

This is achieved without the need to either alter or interfere with the sine wave of the ac supply (as the sinusoidal waveform of the load is unaffected). Therefore our system is harmonically neutral and no "chopping" of the waveform takes place.

All units can be equipped with a bypass facility (optional extra) to enable the safe isolation of the units, if required.

Additional Information :

At the heart of the Varmatic Vario, is our specially designed optimiser system. It has been specially designed and built for the requirements of voltage optimisation. The principles are simple : an input voltage is transformed to a reduced voltage of differing levels (i.e. 6%, 8% or 10% reduction). The appropriate tap selection is chosen based upon site information and analysis including load details, usage patterns and existing voltage levels (including max/mean/min levels). Our engineer will assign the correct tapping level after the site analysis report is complete.

Optional Features :

In addition, the Varmatic Vario can come with optional features including : mains incoming circuit breaker, phase indication, a multi-function meter with internal CTs (connected on the output side of the Varmatic Vario, so accurate readings can be evaluated for the savings), external bypass switch and thermal cutout.

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STANDARD FEATURES :

Input Voltage	415V 3 phase 4 Wire 50Hz (60Hz versions upon request).
Overload Capability	Rating plus 10% (continuous).
Optimisation settings	6%, 8%, 10% or other levels - specifiable upon request (Manually set within Varmatic Vario).
Phase Balancing	Star-Delta transformer winding provides phase balancing improvement reducing losses.
Harmonic Reduction (Tertiary Winding)	10% Delta (tertiary) winding fitted as standard to reduce current and voltage harmonic distortion on the outgoing supply. The delta winding absorbs triplen harmonics up to the capability of the delta fuse rating. The inclusion of this delta harmonic trap assists with compliance with the G5/4 harmonic directive.
Power Factor Correction	Power Factor can be marginally improved by utilising voltage optimisation equipment, however, the levels would be between 0.01 and 0.1 (dependant on load characteristics).
Ambient Operating Temperature	-10°C to +35°C
Cooling	Natural louvred air convection aided by thermostatically controlled cooling extract fan (certain models only).
Cable Entry	Top, as standard, specifiable as client requirements. Aluminium/non ferrous gland plate provided. Installer to ensure gland plate cut to correct size and earthing arrangements, as appropriate.

OPTIONAL FEATURES :

Protection	Circuit breaker protects against current surges and overload conditions. Dependant upon kVA size of Varmatic Vario, the Circuit Breaker allows for Long term, Short Term and if selected instantaneous trip characteristics.
Front panel display with pushbutton operation	3 Line Backlit LCD display with 4 selection buttons; Current: I out (per phase), I out max (per phase) Voltage: V out (per phase), V frequency Power: kW, kVarh, KVA, kW max, power factor Energy consumption: kWh / KVARh
Monitoring	Remote monitoring via a secure web page.
Power Factor Correction	Similar to all other voltage optimisation devices, the Varmatic Vario provides a certain amount of power factor correction. However, to improve power factor significantly, a specialised power factor correction unit can be incorporated into the Varmatic Vario. The Power Factor Correction (PFC) unit comes in its own enclosure and can be connected along with the Varmatic Vario or separately. All PFC units are automatically switched, and correct the power factor to the optimum level required. The benefit of increased / improved power factor means additional electrical kVA/kVARh savings plus additional CO2 emission reductions.
Bypass Switch	To ensure complete peace of mind in the unlikely event of a failure, SDC Industries offer a bypass switch. The bypass is provided in a separate enclosure and allows the Varmatic Vario to be taken out of circuit. This rotary switch offers three settings: NORMAL (i.e connection through the Varmatic Vario), BYPASS (i.e Varmatic Vario bypassed) and OFF (i.e both Mains and optimised supplies are isolated from the load). This last option also allows for the Varmatic Vario to be completely isolated (in & out), in case full access to the Varmatic Vario enclosure is required.
Maintenance	The Varmatic Vario needs little or no maintenance. However, for peace of mind, our fully trained and experienced service engineers offer optional maintenance contracts, generally on an annual basis (however, can be more frequently, if requested). This service would include for a full service and inspection of your Varmatic Vario unit and includes a thermal imaging analysis. A full report including thermal graphic information is provided after the visit. As standard for this visit, the service will be carried out safely without the need to isolate the Varmatic Vario.

STANDARDS :

The Varmatic Vario is manufactured in accordance with ISO 9001 and ISO 14001 and is manufactured to the following standards (as applicable):

- BS EN ISO 14001:2004
- BS EN ISO 9001:2008
- BS7806
- BSEN 60076
- BS171
- LVD (Low Voltage Directive) 2006/95/EC – EN60947
- EMC (Directive of Electromagnetic Compatibility) 2004/108/EC – EN60947
- Class H Insulation to BS2757 - Class C
- 160°C Thermal cut-out contacts built within optimiser unit. Contacts will open if temperature is exceeded.
- IEC726 Class H.

CARBON FOOTPRINT :

- All Varmatic Vario units are:
 - 100% recyclable at end of life expected to be no less than 30 years, with all packaging able to be recycled.
 - Low carbon footprint of transport from point of manufacture to site, because the Varmatic Vario is manufactured in UK.

43 Tonnes of CO2 emissions saved per every 100,000 kWhs of electricity saved

WEIGHTS AND DIMENSIONS

The following table shows approximate sizes, weights and losses of the VARMATIC VARIO. This is a guideline only - for actual size, please speak to our engineers at time of ordering.

Please note, these units are single cubicle systems.

Vario Rating	Optimiser Panel (LxDxH) in mm	Est. Weight (kgs)	Est. Watts Loss
50KVA*	500 x 600 x 660 (SDC1)	98	625
75KVA*	500 x 600 x 660 (SDC1)	117	780
100KVA*	500 x 600 x 660 (SDC1)	155	860
150KVA	700 x 660 x 800 (SDC2)	194	1015
200KVA	700 x 660 x 800 (SDC2)	233	1200
250KVA	700 x 660 x 800 (SDC2)	267	1360
300KVA	800 x 700 x 890 (SDC3)	294	1600
400KVA	800 x 700 x 890 (SDC3)	354	2360
500KVA	900 x 750 x 1050 (SDC4)	441	2695
600KVA	900 x 750 x 1050 (SDC4)	479	2940
700KVA	900 x 750 x 1050 (SDC4)	510	3185
800KVA	900 x 750 x 1050 (SDC4)	527	3465
1000KVA	1400 x 900 x 1075 (SDC6)	931	3655
1250KVA	1400 x 900 x 1075 (SDC6)	950	4355
1500KVA	1400 x 1000 x 1250 (SDC7)	1050	5545
1600KVA	1400 x 1000 x 1250 (SDC7)	1050	5850
2000KVA	1536 x 960 x 1818 (drwg 029)	1400	6790
2500KVA	1920 x 1152 x 2010 (drwg 034)	1600	10310
3000KVA	1920 x 1152 x 2010 (drwg 034)	2000	13380

- For smaller/larger sizes, please refer to SDC Industries Technical Department.
- Cooling Fans are used on 1000KVA units and above.
- 1600KVA and below via top entry/exit aluminium gland/top plate. For 2000KVA and above, please refer to Technical Department.
- Internal busbar termination support, standard with units of 1000KVA and above.
- All above details are subject to alteration and revision.
- No doors (only lift off panels) on units 1600KVA and below.
- All 2000KVA and above optimiser panels will either be doors or lift off panels. If door, hinge on LHS.
- Basic unit not inclusive of incoming protection or bypass facility. These can be supplied as options.
- (S) symbolises a specially designed cubicle.
- *Wall mounting bracket available (at extra cost).