Voltage optimisation
Reducing energy, saving money
An introduction to voltage optimisation

Reducing energy consumption is key to cutting bills, lowering carbon emissions and reducing exposure to fluctuating energy prices.

To help you do this, Marshall-Tufflex manufacture and supply a range of energy saving products to help you achieve your targets. We are a privately owned UK engineering and manufacturing company with over 70 years experience in the electrical industry and a reputation for quality and innovation.

Marshall-Tufflex provides a holistic energy management solution. Depending on your needs, we can deliver multiple energy reduction solutions in a single platform, or individual specific solutions. Our intelligent commercial and domestic voltage optimisation units are manufactured in our UK factories.
What is voltage optimisation?

Voltage optimisation is a well-established, proven technology that manages incoming voltage and reduces it to a level more suitable for your appliances. In the UK, the average electricity supply is around 240Volts, which is high compared to other countries. Electrical appliances with the CE mark must be capable of working across a wide voltage range; anywhere between 207-253Volts.

How does it work?

Our Voltis units reduce the voltage using transformers. We reduce the mains voltage to around 220Volts, a level that allows the electrical appliances in your building to operate more efficiently.

Why do I need it?

Supplying appliances at higher than 220Volts, wastes energy. As well as getting larger bills and the negative environmental impact, appliances deal with the extra voltage by generating heat or vibration, which means they wear out faster.

Why choose Marshall-Tufflex?

Marshall-Tufflex’s Voltis units intelligently manage voltage by monitoring the mains voltage supply and power demand of the building, adjusting output automatically. This enables the electricity supply to better match the needs of appliances and the building at all times. Thus, resulting in greater efficiency, significantly reduced wasted energy and savings on energy bills.
Is voltage optimisation suitable for your building?

Every building is different, so the level of savings will vary, however any building that uses electrical appliances and lighting should be considered for voltage optimisation.

Checks should be made to establish the existing mains voltage supply level. Whilst the UK supply is typically around 240Volts, some properties could be lower and therefore voltage optimisation may not always be suitable.

The make-up of the electrical load should also be checked, as not all electrical appliances will benefit from voltage optimisation. For example, appliances that convert electricity to heat will not generally benefit.

### Savings calculator – Ohm’s Law

Voltage optimisation can be explained using Ohm’s Law:

\[ \text{Power} = \frac{\text{Voltage}^2}{\text{Resistance}} \]

These calculations are based on a constant resistance (R) of 20 Ohms (Ω), a non-optimised voltage (V) of 242V and an optimised voltage of 220V, with a cost of £0.10/kWh.

#### Non-optimised supply

\[
\begin{align*}
\text{Power (P)} &= \frac{242V \times 242V}{20\Omega} \\
2928W (P) &= \frac{58,664V}{20\Omega} \\
2.928kW &= \frac{2928W}{1000} \\
£0.10/kWh \times 2.928kW &= £0.2928/h \\
£0.2928 \times 24hrs &= £7.03/day \\
\end{align*}
\]

#### Optimised supply

\[
\begin{align*}
\text{Power (P)} &= \frac{220V \times 220V}{20\Omega} \\
2420W (P) &= \frac{48,400V}{20\Omega} \\
2.42kW &= \frac{2420W}{1000} \\
£0.10/kWh \times 2.42kW &= £0.242/h \\
£0.242 \times 24hrs &= £5.81/day \\
\end{align*}
\]

**Save £1.22 a day or 17.4%**

The above calculations and percentage savings are for example purposes only. Please note, savings will vary depending on power supply and electrical appliances used.
CE Mark

Since 1993, electrical products must carry a CE mark to show that they have been tested and comply with all the relevant new harmonised standards. Therefore, any electrical equipment carrying the CE mark has to be capable of working between 207V – 253V.
Voltis Home and Voltis 100Amp voltage optimisation units are ideally suited to locations utilising a single phase electricity supply and with a load of up to 60Amps for Voltis Home, and 100Amps for Voltis 100Amp. The units use the same technology as the commercial units, just in a smaller format.

Units are positioned between the electricity meter and consumer unit and are easily installed by a qualified electrician. Once installed, they are maintenance-free and offer immediate savings.

Our voltage optimisation units come with an automatic bypass function as standard. This means that they automatically adjust to suit the energy supply and demand, which ultimately means they maximise potential savings.

We recommend that the incoming voltage and main fuse rating is checked prior to installation, to ensure that the appropriate Voltis unit is installed.

On the rare occasion that the typical incoming voltage to a building is below 230Volts, please contact us.

Why choose Voltis?

- Saves money on your electricity bills
- Reduces energy waste and carbon footprint
- Increases the life of electrical appliances
- Easy to install by a qualified electrician
- Suitable to work alongside solar PV installations
Product specifications

<table>
<thead>
<tr>
<th>Unit</th>
<th>Voltis Home</th>
<th>Voltis 100Amp</th>
</tr>
</thead>
<tbody>
<tr>
<td>Product code</td>
<td>VH60HD</td>
<td>VH1001</td>
</tr>
<tr>
<td>Temperature range</td>
<td>-10 to 40°C</td>
<td>-10 to 40°C</td>
</tr>
<tr>
<td>Humidity</td>
<td>Up to 90%</td>
<td>Up to 90%</td>
</tr>
<tr>
<td>Dimensions</td>
<td>300mm(w) x 240mm(h) x 147mm(d)</td>
<td>420mm(w) x 360mm(h) x 195mm(d)</td>
</tr>
<tr>
<td>Weight</td>
<td>14kg</td>
<td>33kg</td>
</tr>
<tr>
<td>Rating</td>
<td>60Amps in Save (100Amps in Mains*)</td>
<td>100Amps</td>
</tr>
<tr>
<td>Suitable incoming voltage</td>
<td>230-253Volts</td>
<td>230-253Volts</td>
</tr>
</tbody>
</table>

NB. On the rare occasion that the typical incoming voltage to a building is below 230Volts, please contact us.
*Voltis Home rated to 60Amps for 30 minutes and 40Amps continuous load.

Voltis Home

Voltis Home is suitable for all buildings with an incoming single phase supply rated up to 100Amps and with a load of up to 60Amps. This typically includes most residential properties.

Voltis 100Amp

The Voltis 100Amp unit is suitable for any building with a single phase supply and with a load of up to 100Amps. This typically includes large residential properties, retail units, offices, care/medical facilities, hotels, pubs and restaurants.
Three phase solutions

Voltis PRO

Commercial units
Our Voltis PRO commercial voltage optimisation units cater for larger premises with greater electrical demands and a three phase supply. We supply standard units from 100Amp to 400Amp, however larger, bespoke units are also available.

Intelligent optimisation
Voltis PRO units intelligently control electricity supply and demand. They constantly monitor your site’s incoming voltage and demand level, then adjust to maximise the potential savings, also providing a level of protection to the integrity of your supply and appliances.

Automatic bypass
Voltis PRO has automated bypass functionality, enabling the unit to switch seamlessly via the ‘neutral’ to avoid any break in supply between ‘Mains’ and ‘Save’ mode, safeguarding your power supply without the need for manual operation.

Remote monitoring/measuring performance
All Voltis PRO units are fitted with meters which provide management information and the ability to get an indication of savings from the unit and or through remote access.

Building suitability
We can provide a quick assessment on the potential suitability for our three phase units. All you need to do is supply us with 3 months or more electricity bills, along with a mains voltage level reading, for an indicative appraisal. However, we would recommend a full survey be completed prior to any final decisions. This will give us a greater understanding of how your electricity is supplied and used, to help establish the potential benefit that voltage optimisation could contribute to energy saving.
Voltis PRO can be installed by a qualified electrical engineer or electrician. All components are integrated into the overall footprint – no additional space is needed for installation. If all preparation work is completed beforehand, a typical installation only involves 1-2 hours downtime. If alterations to transformers are needed, Voltis PRO can be switched to Engineer’s Bypass mode, enabling no site power downtime. Voltis PRO has capability for the control system to be shut down and re-engaged without power downtime.

- Multi-tap transformers enable on-site adjustment to suit incoming voltage level or changes.
- Inspection requirements for fixed wiring regulations can be done without shutting down site supply.
- Voltis PRO can be connected to customer’s BMS or a PC running Marshall-Tufflex software, and can even send text alerts.
- Dramatically extends the life of all electronic and electrical equipment.
- Protects equipment by reducing the harmonics and improving the quality of power to your equipment.

Voltis ECO

Marshall-Tufflex have developed the Voltis ECO range to suit sites where a basic voltage reduction is all that is required. Voltis ECO is suitable for three phase supplies with a load of 100Amps, 200Amps, 300Amps and 400Amps. The range features a multi-tap transformer, which allows adjustments at installation to suit the voltage level and the amount the installer and client wish to drop the incoming voltage by.
Software for commercial units

Control Centre

Our Control Centre software* collates information recorded by Voltis PRO to help organisations manage their energy. Data is taken from different energy inputs and translated into easy-to-read reports and graphs. This can help organisations promote their energy saving commitment to stakeholders including employees, shareholders and customers.

*Not applicable to Voltis ECO.

More than a dashboard

- Automated data collection
- Save Managers’ time with tailored, scheduled automated energy reports
- Clear and easy to navigate and understand
- Works alongside the majority of energy saving technology
- Easy to understand format is an ideal tool to promote your energy efficient policies
- Data can be drilled down to specific areas of your organisation
- Our Control Centre has the capability to monitor, administer and manage your organisation’s energy use all in one simple platform
Standards

Established in 1942, Marshall-Tufflex is a manufacturing and engineering company with in-house assembly, design and technical capability. We fully support any installation and pride ourselves in offering excellent customer service and comprehensive technical support.

Quality Assurance
Our products meet the highest technical standards and we are recognised by the BSI as a firm of Assessed Capability to BS EN ISO 9001:2008. Manufacturing and installation complies to BS 7671:2008.

Carbon Assessment
Marshall-Tufflex has been assessed by the Carbon Trust and received an excellent report.

Environmental Standards
Marshall-Tufflex is totally committed to achieving high environmental standards and is recognised by the BSI as a firm of Assessed Capability to BS EN ISO 14001:2004.

ESTA
We are a member of ESTA (Energy Services and Technology Association) - the UK’s leading energy management industry association.
In pursuance of our policy of continued improvement
Marshall-Tufflex reserves the right to change the design or specification of its products without notification.

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