

## WhitePaper

# Fault-Tolerant Clean Power Provisioning ver. 1.0

*“delivery of safe and clean continuous power”*

Continuous availability -regardless of the public network- of electrical power is much more than just a “nice to have” feature. Alarm systems, smoke and fire detection systems, data storage systems, home automation, and in some cases life-supporting systems, all of them rely on the continuous provision of clean electrical power. Therefore Van Welleman Villas® - by default- includes the provision of clean and fault-tolerant power provisioning into its standard sales offer.

Ideally, electrical power is continuous (i.e. it is always available), constant (i.e. 230VAC at 50Hz without drops, losses or peaks), clean (i.e. no power surges or HF noise), and properly grounded with a zero volt earth.

Unfortunately, the public power provider can not provide this type of service due to physical constraints (e.g. lightning hits, power-line impedance, load fluctuations, solar winds, inductive load etc.) as well as economical constraints (e.g. infrastructure cost, maintenance cost, ROI, etc.). As a matter of fact, due to the ever-growing savings on infrastructure and operations, there is little or no hope for improvement in the near nor far future ... on the contrary.

That is why Van Welleman Villas® starts from scratch generating super clean power, free from voltage drops, power losses, surges, over-voltage RF and HF Noise, frequency fluctuations or a floating ground.

The above is done using an industrial 3-phase diesel power aggregate that generates your own electricity in case of power outage. No matter how short (hours) or long (months) the black-out persists. Also, all incoming power is protected by professional over-voltage protection (against massive lightning hits), RF/HF filters (protecting against noise and unwanted signals) and an heavy-duty 3-phase insulation transformers to ensure a clean zero volt ground/earth.

Finally, an industry-grade online UPS (Uninterruptible Power Supply) generates a pure 3-Phase electrical power source that is perfect, even for the most demanding and/or sensitive electronic equipments, regardless of the technical requirements (ICT or medical specs).

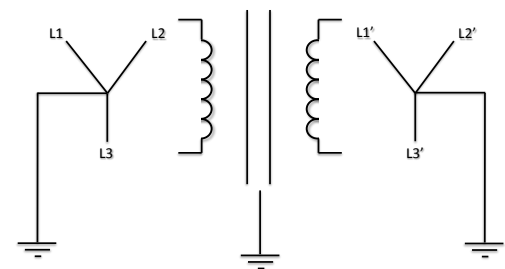
The following advantages arise out of this approach :

- Protection against massive lightning-surges.
- Full power availability, even upon long-term black-outs.
- No power-dips, not even for a fraction of a second.
- Clean power for ALL your sensitive electronic equipments.
- Reactive power compensation.
- Galvanic insulation for a clean grounding.
- Enabling a near-perfect residual-current protection.
- Enabling a near-perfect arcing-vault detection.

All of the above is done with one purpose only ... ensuring the very best and safest electrical systems for our customers.

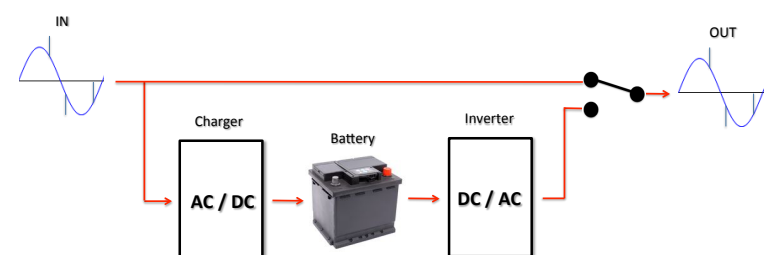
### Galvanic Insulation

A galvanic insulation from the public power line ensures that internal and external AC power are fully insulated from each-other.



### Offline UPS

An offline UPS only switches the inverter on upon a mains power loss. It thus “occasionally” generates AC power and does so until the mains supply is restored to normal.



### Online UPS

An online UPS uses the mains power to continuously charge batteries which in-turn feeds an Inverter which always (re)generates AC power. As such power is always clean and available. However, due to its continuous required availability, this type of UPS much be much more robust, and thus also more expensive.



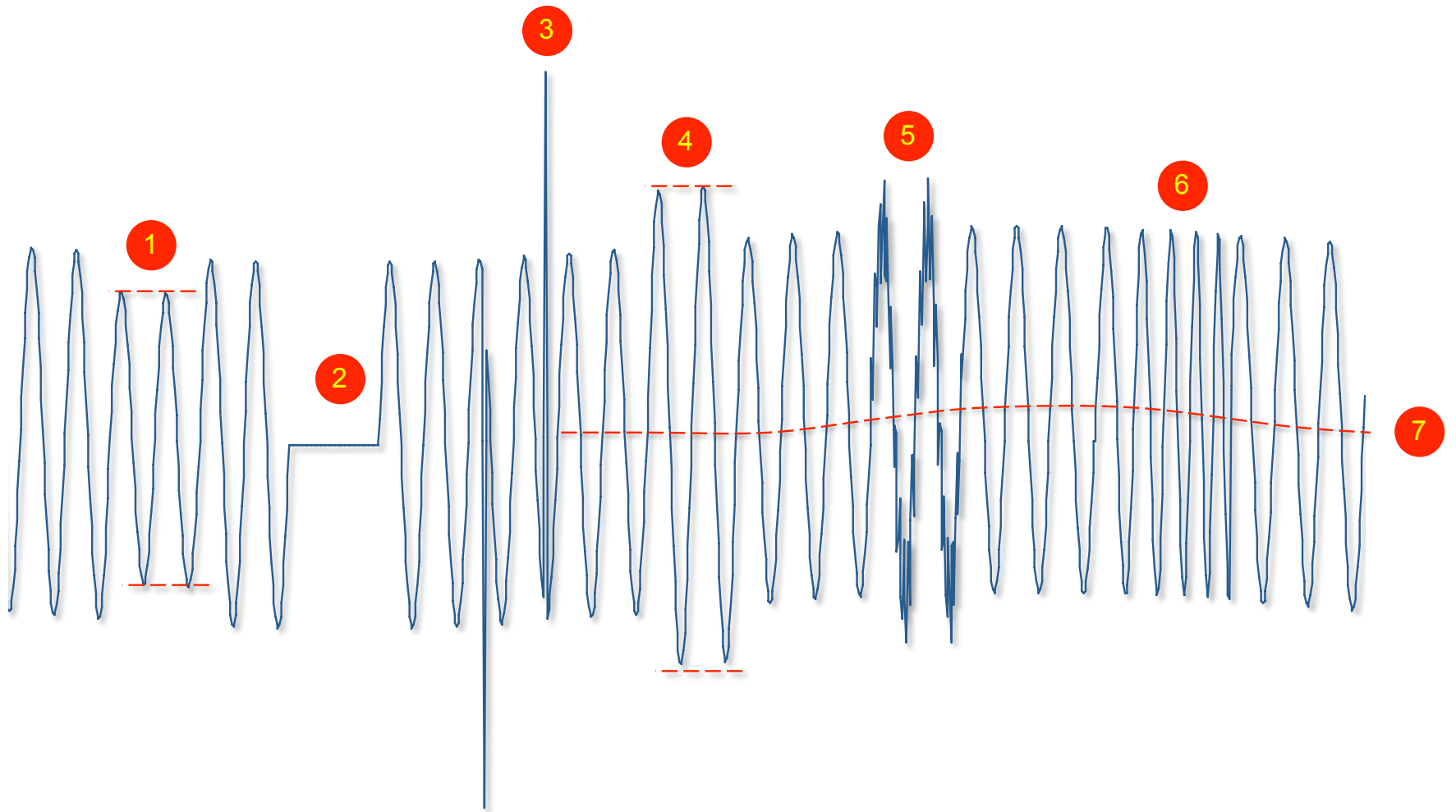


fig 1. Anatomy of a distorted power signal.

(1. Voltage drop 2. Power loss 3. Surge 4. Over-voltage 5. HF Noise 6. Frequency fluctuations 7. Floating ground)

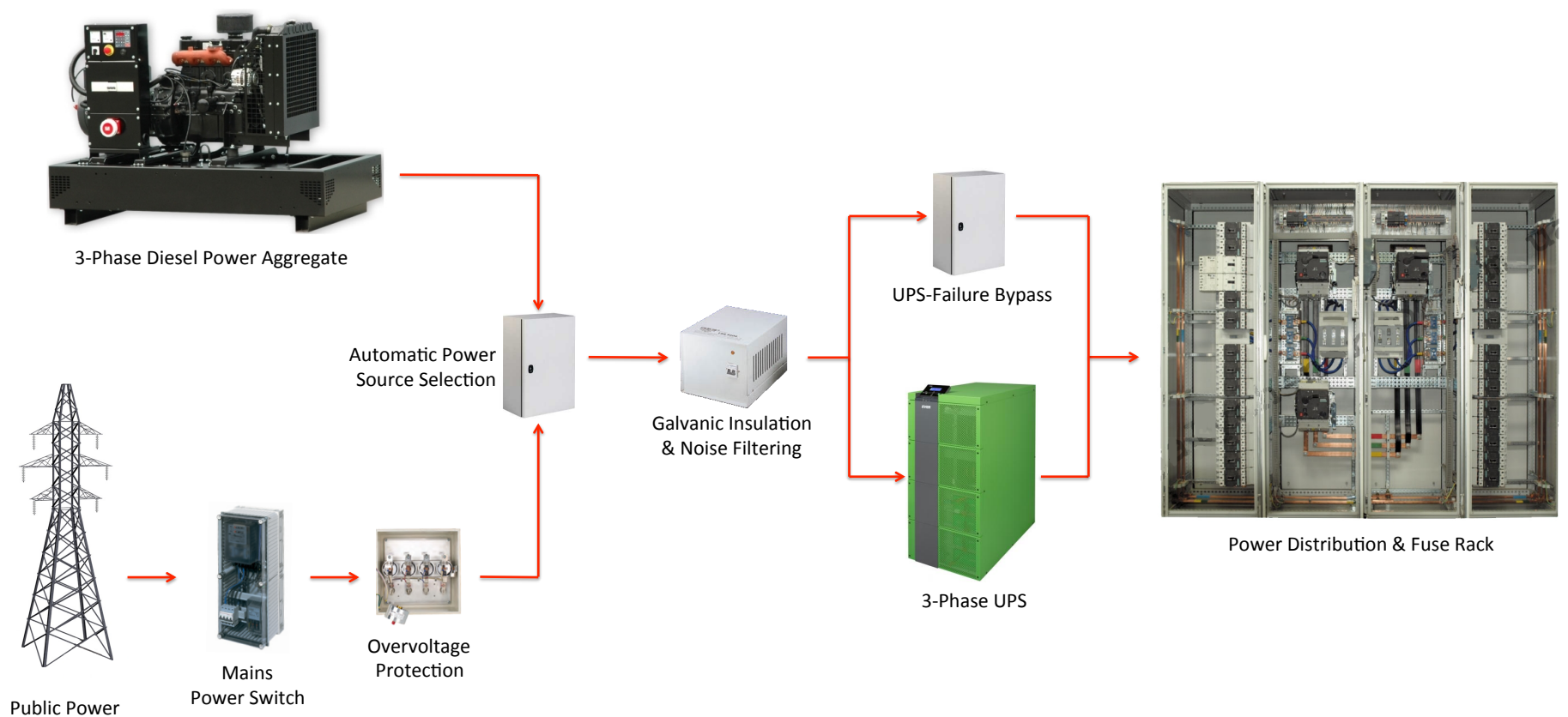


fig 2. Typical Van Welleman Villas® fault-tolerant clean power provisioning architecture.  
(i.e. the example above is included in the minimal “standard” proposal)