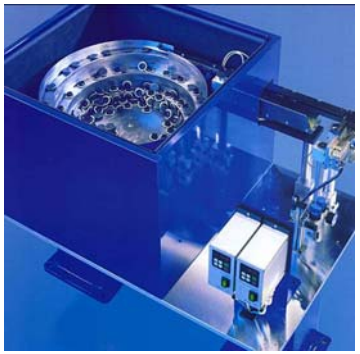
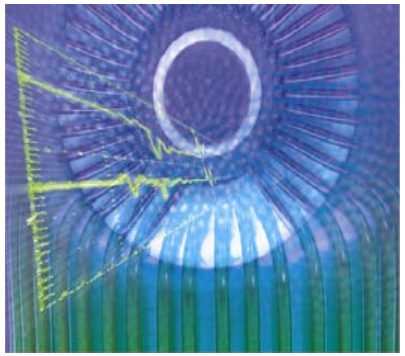
REO Group



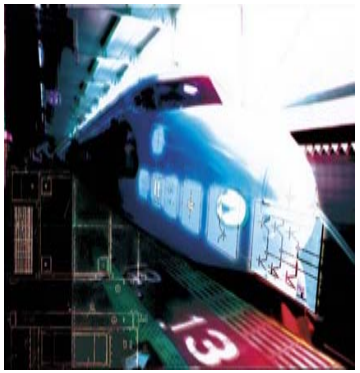
Automation

Renewables

Drive Systems



Inductive Components



Railway

Test

Medical

Power Control

REOTRON 2-Stage Controller with transformer

REOTRON – 2 Stage phase angle controller

A new controller, employing novel technology, that is designed to provide a price-effective solution for applications that require power, current or voltage regulation with some power factor correction and a smoother process control.

Background information

Traditional phase-angle control causes lots of harmonic current distortion on the mains power supply. This in turn creates voltage distortion which affects power quality.

There is no simple accessory available for reducing this problem.

Background information

However, when simple voltage or current regulation is required often phase-angle control is the cheapest solution.

Applications

Possible applications include…….

- water treatment
- electro-chlorination
- ozone generation
- electroplating

Applications

and……

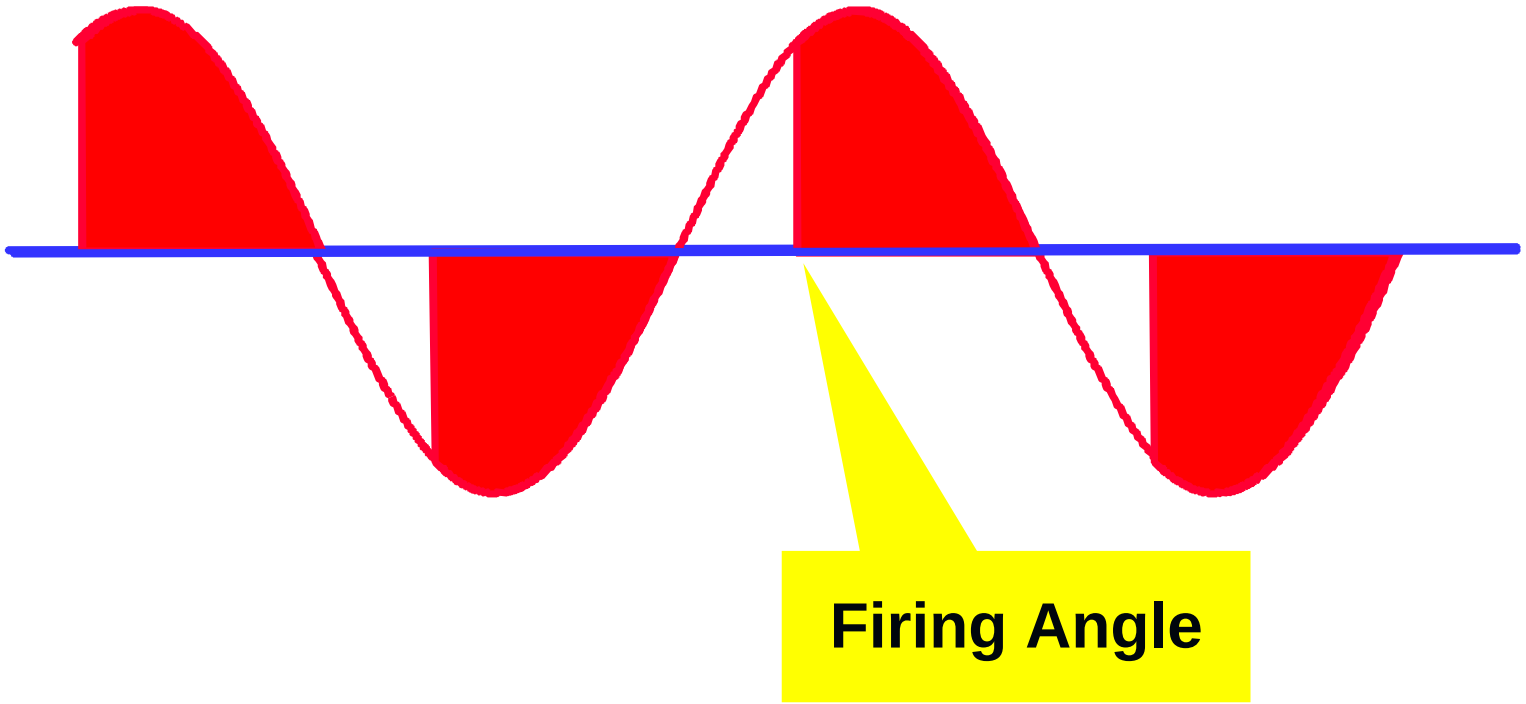
- lasers
- UV generators
- electro-deposition
- cathodic protection
- smelting

How conventional phase-angle control works

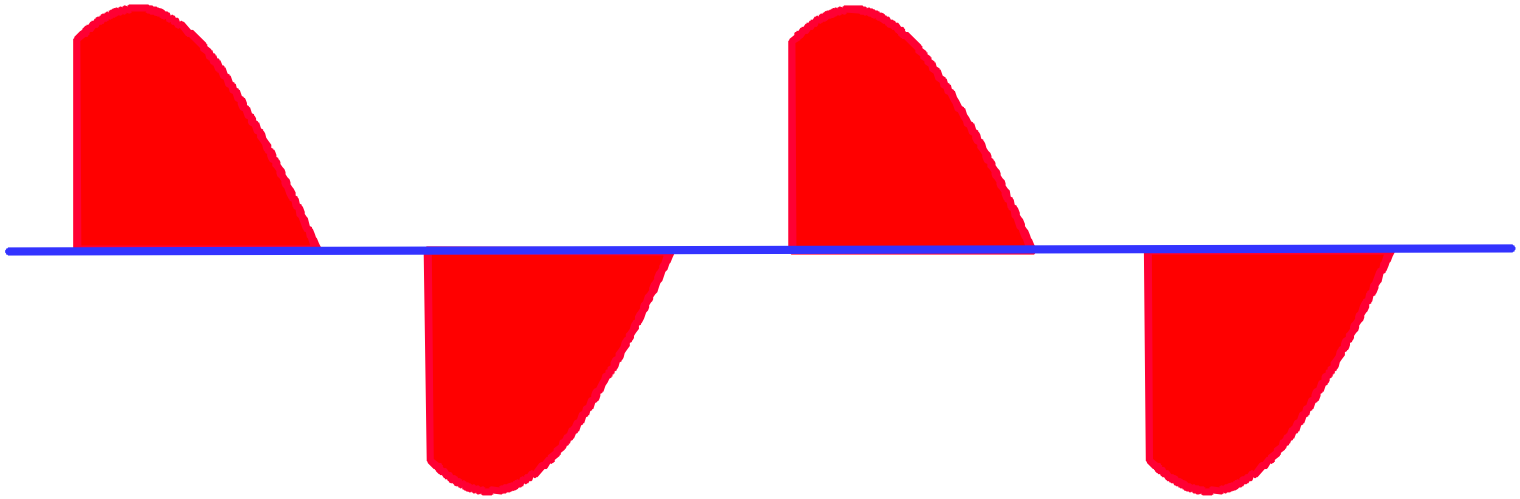
Thyristor and triacs are switched on by using a gate. They automatically switch off again when the conducted current reaches zero. Therefore, these devices can be used in power regulators and by switching at a predetermined position on the AC sine wave (the phase-angle) the effective voltage can be reduced or increased.

This can be used to regulate voltage or voltage or power to a load.

Conventional phase-angle control



Conventional phase-angle control



Disadvantages of phase-angle control

- Phase-angle control creates lots of harmonic distortion (so do switch-mode controllers).
- This can have a detrimental effect on protective devices, transformers, conductors and other equipment nearby.
- Some loads are adversely affected by thyristor controllers because they do not produce a pure sine wave but more of a saw-tooth wave.

How 2-stage control works

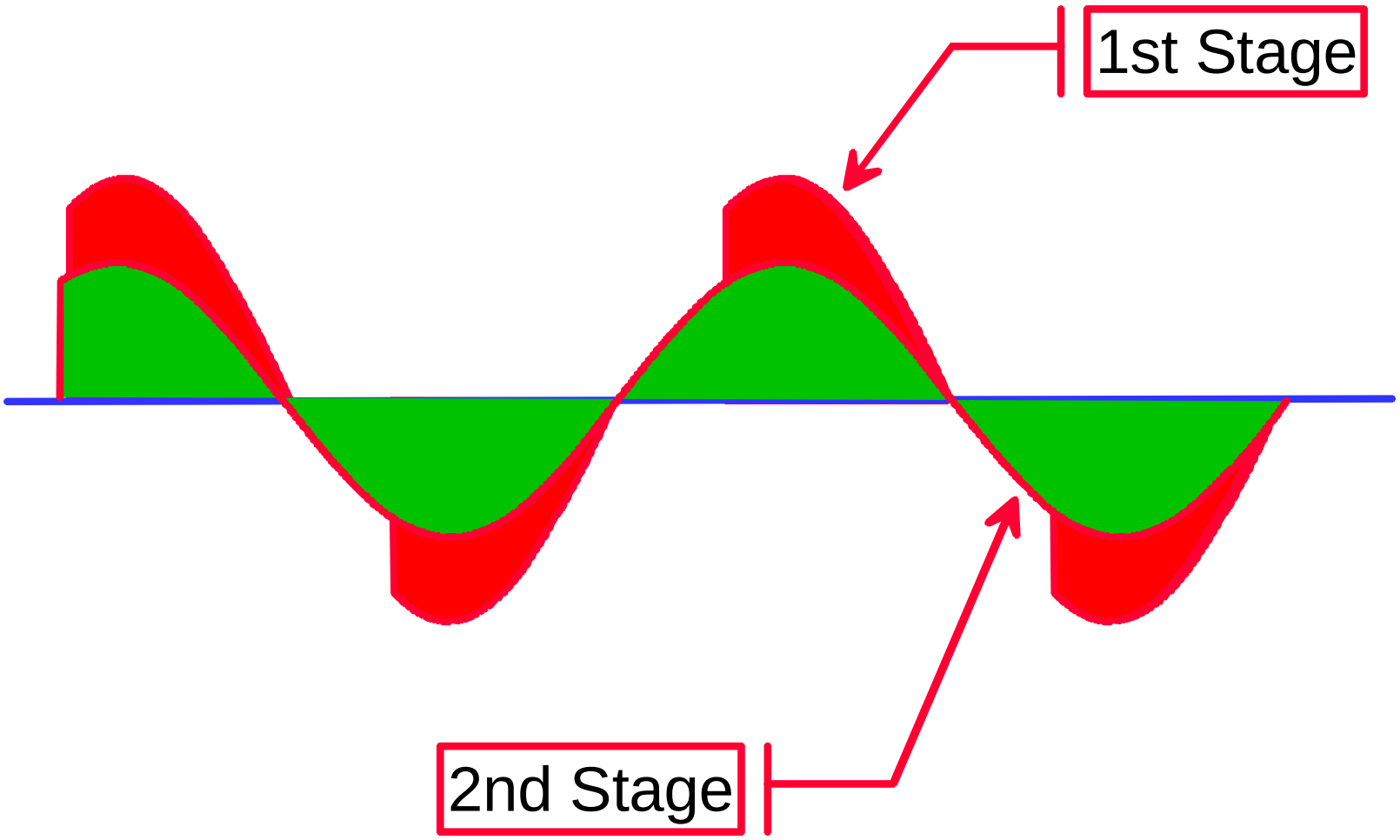
A 2-stage controller produces two outputs;

One of these is a conventional phase-angle controlled voltage (typically up 400V)……

…..and the other is a continuous underlying voltage (typically up to 170V).

By doing this two things are achieved; voltage is always applied to the load and voltage regulation can be applied.

How it works

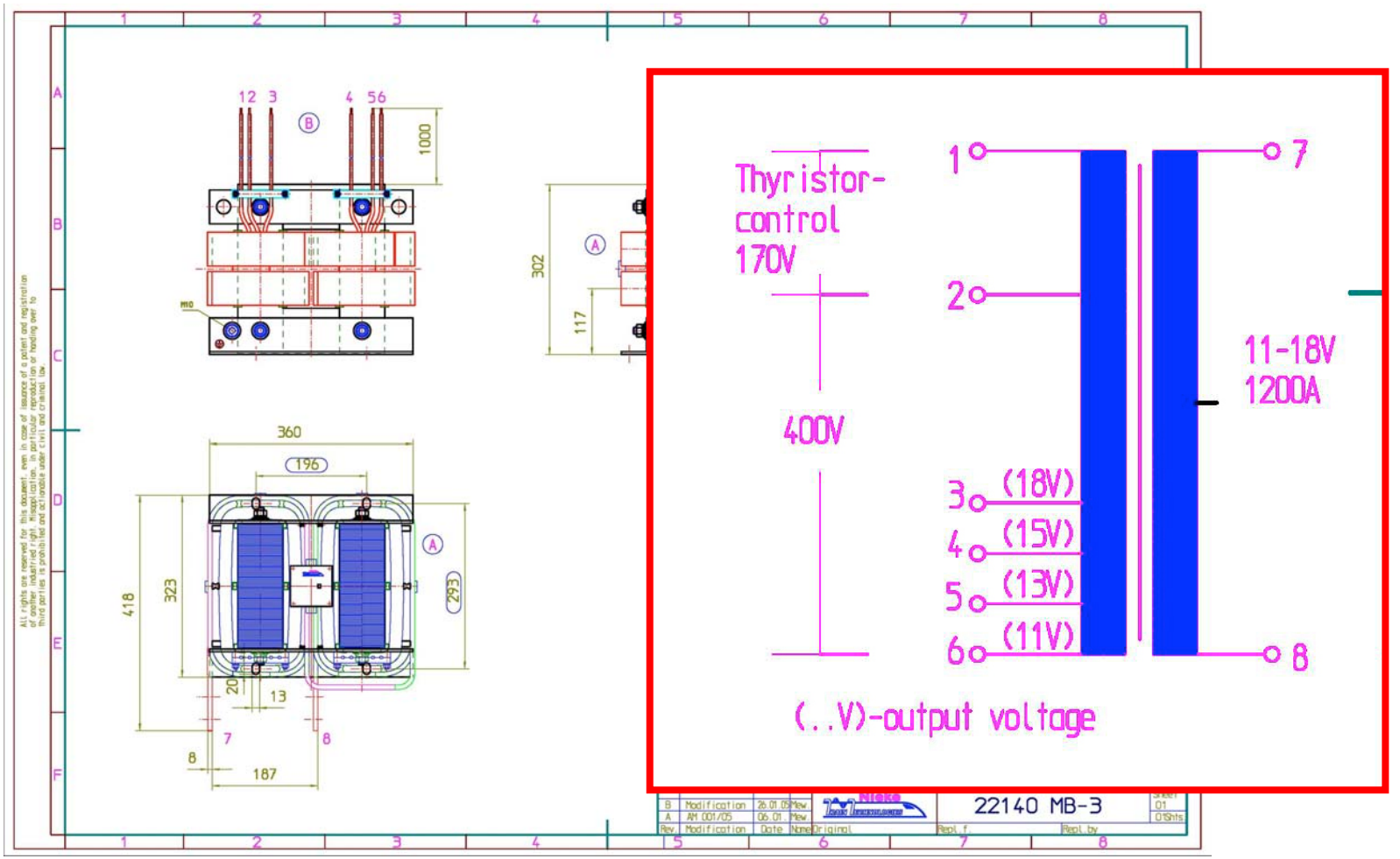


Result

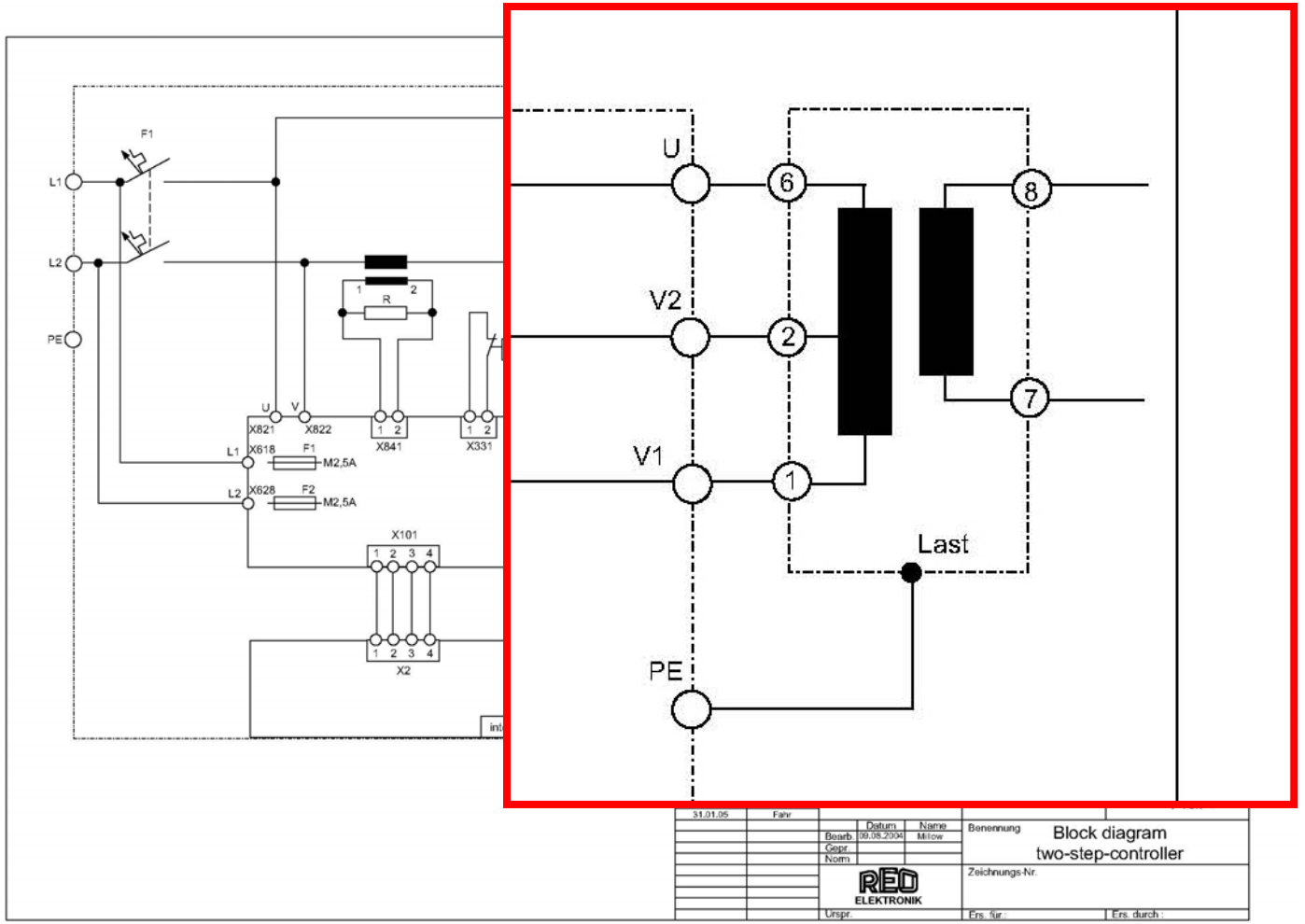
By doing this two things are achieved; voltage is always applied to the load and voltage regulation can be applied.

REOTRON 2-Stage Controller with transformer

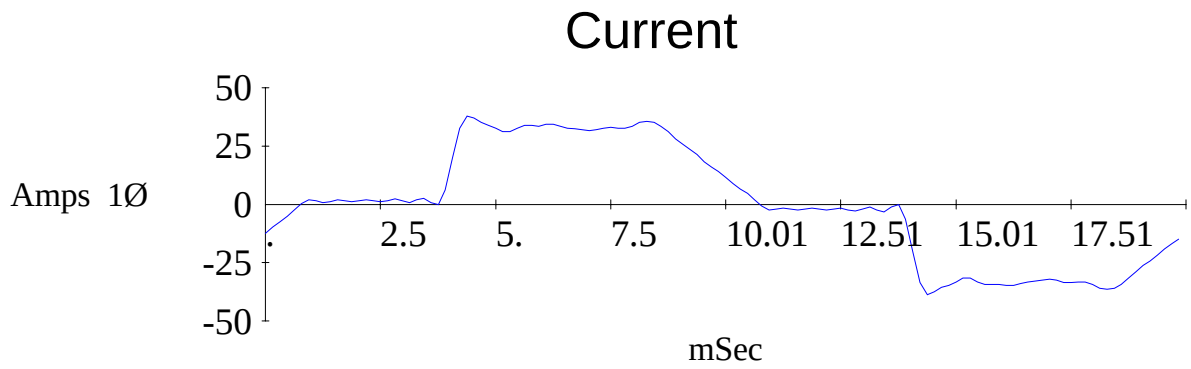
Transformer Circuit



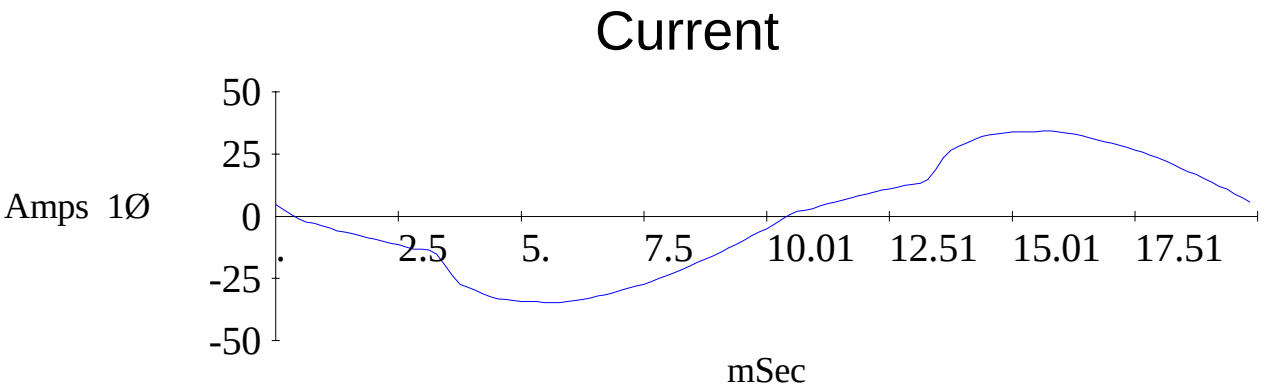
Control Circuit



Improved power factor



KW=8.20
KVA=10.1
8 P.F=0.81



KW=9.31
KVA=9.67
P.F=0.96

Benefits

- Reduced Harmonic Distortion
- Improved Power Factor
- Lower current draw
- Cost effective – especially if the output voltage has to be stepped up or down
- Smoother process
- Energy efficient
- Lower installation costs

For more information

On REOTRON products visit the REO UK Website at www.reo.co.uk/powerelectronics

On harmonics www.reo.co.uk/kbase_article/116

For general information on all REO products www.reo.co.uk

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