



The Equalizer TURBO

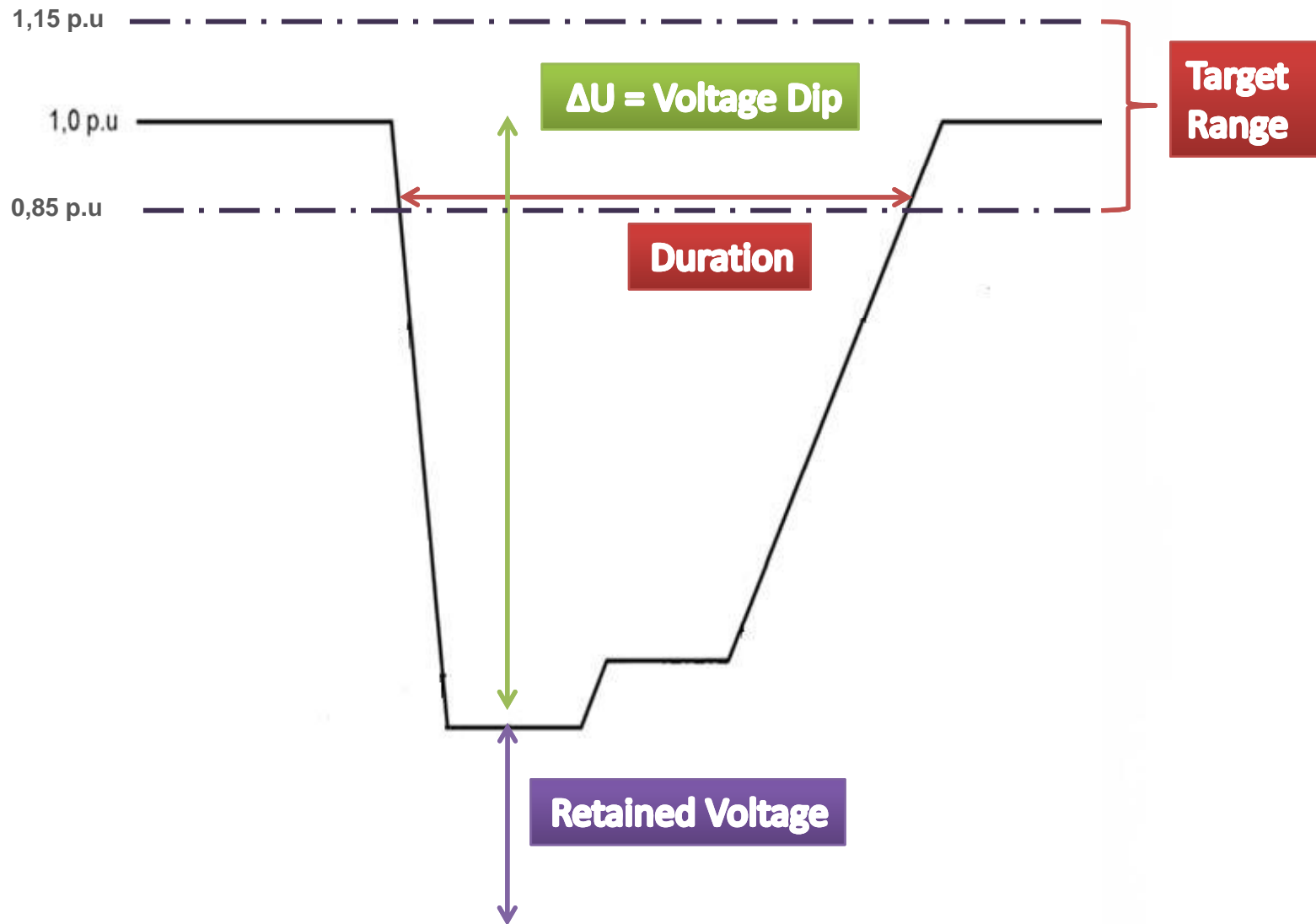
**Equalizer TURBO电压跌落的解决方案
以色列Elspec公司产品**

The Problem 电压跌落的问题

- Sags are short-term reductions in the RMS magnitude of the supply voltage lasting from a fraction of a second up to several seconds. 跌落是短时间内供电电压RMS有效值，持续1秒到几秒的减少。
- According to IEEE:1159 Voltage Dip 0.5 to 30 cycles typical magnitude 0.1 -0.9pu. 根据IEEE:1159，电压骤降典型为0.5 ~ 30周波，幅值为 0.1 -0.9pu。
- increasing concern for process industries due to increasing automation. Automated facilities are more difficult to restart, and the electronic controllers used are sometimes more sensitive to voltage sags than other loads. 自动化程度增加，电压跌落越来越被关注，自动化设备难以重新启动，电子控制器有时对电压跌落更加敏感。
- Many voltage disturbances results in **disruption** and **financial loss**. 过多电压干扰导致设备损坏和经济损失。

Typical Sag Characteristics

跌落的典型特点



Application 实际中的应用

- These are huge costs for what might seem to be trivial events lasting less than a second.

持续不到一秒钟的看上去微不足道的事件，会造成巨大的成本损失。

- For continuous processes, such as ***plastic extrusion*** or ***papermaking***, the effect of a dip is just as serious as a complete blackout, with the same cleanup costs, raw material losses and lost production.

对于连续的作业过程，如挤塑机或造纸行业，一个电压骤降的影响，如同一个彻底的停电过程一样严重，随之会增加成本、造成原材料损失和生产损失。

The Answer: Elspec Equalizer TURBO

解决的方法: Elspec Equalizer TURBO



What Equalizer Turbo is ?

什么是Equalizer Turbo ?

The Ultimate real time dynamic compensation system, voltage support in short time, for low and medium voltage sag problems. 实时动态补偿系统，在短时间内提供电压支持，适用于中低压系统的电压跌落问题。

- What data is necessary to calculate the system size 计算系统大小的必要数据：
- Size of the load to be protected 需要保护的负载功率大小。
- Duration of typical Sags (less than a second, less than 3 seconds, other length) 典型的跌落持续时间（小于1秒、小于3秒、或其他时间）。



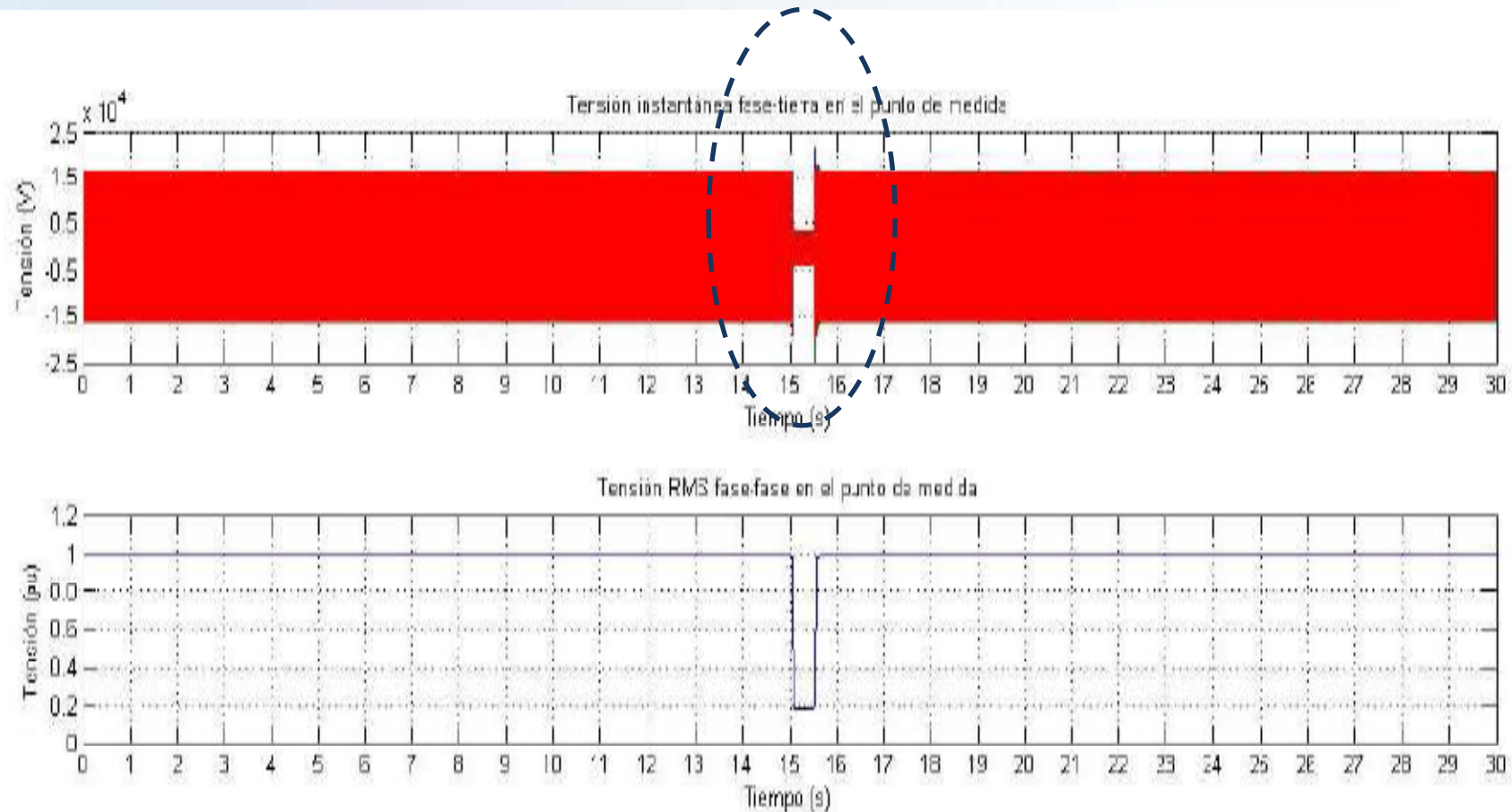
Equalizer Turbo 技术特点

- Designed to ride-through three-phase up to 0.2 p.u., $\Delta U =$ voltage dip 80% with typical 3 seconds duration. 设计的三相最大穿越到 0.2 p.u., $\Delta U =$ 电压跌落80%、典型为3秒的持续时间。
- or special conditions, even longer duration can be provided. This ride-through capability easily covers almost all voltage disruptions in developed countries. 特殊情况下甚至更长时间也可以提供, 这个穿越能力能涵盖几乎所有发达国家的电压中断。
- Equalizer TURBO restores the voltage to 1.0 p.u. of its nominal value (+-15%). Equalizer TURBO 恢复电压为它的标称值的1.0 p.u (+ -15%)。
- Due to independent phase compensation, Equalizer TURBO can correct each phase accurately and independently. 由于独立的分相补偿, Equalizer TURBO可以准确和独立地进行每相的补偿。

Typical voltage sag without Equalizer TURBO

没有Equalizer TURBO的典型电压跌落

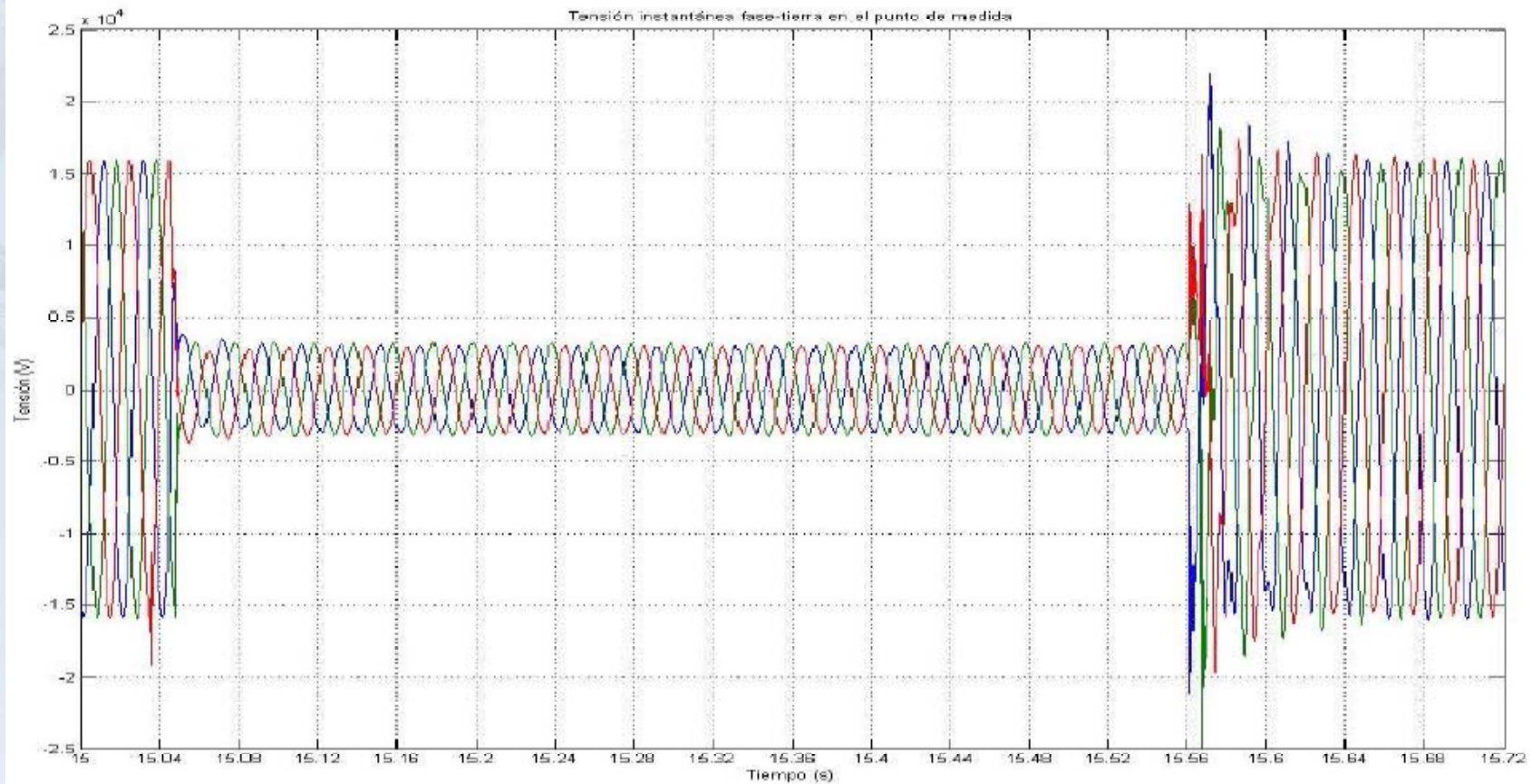
跌到电压: 0.2 p.u, 跌落等级80%, 持续时间: 0.6 sec



Typical voltage sag without Equalizer TURBO

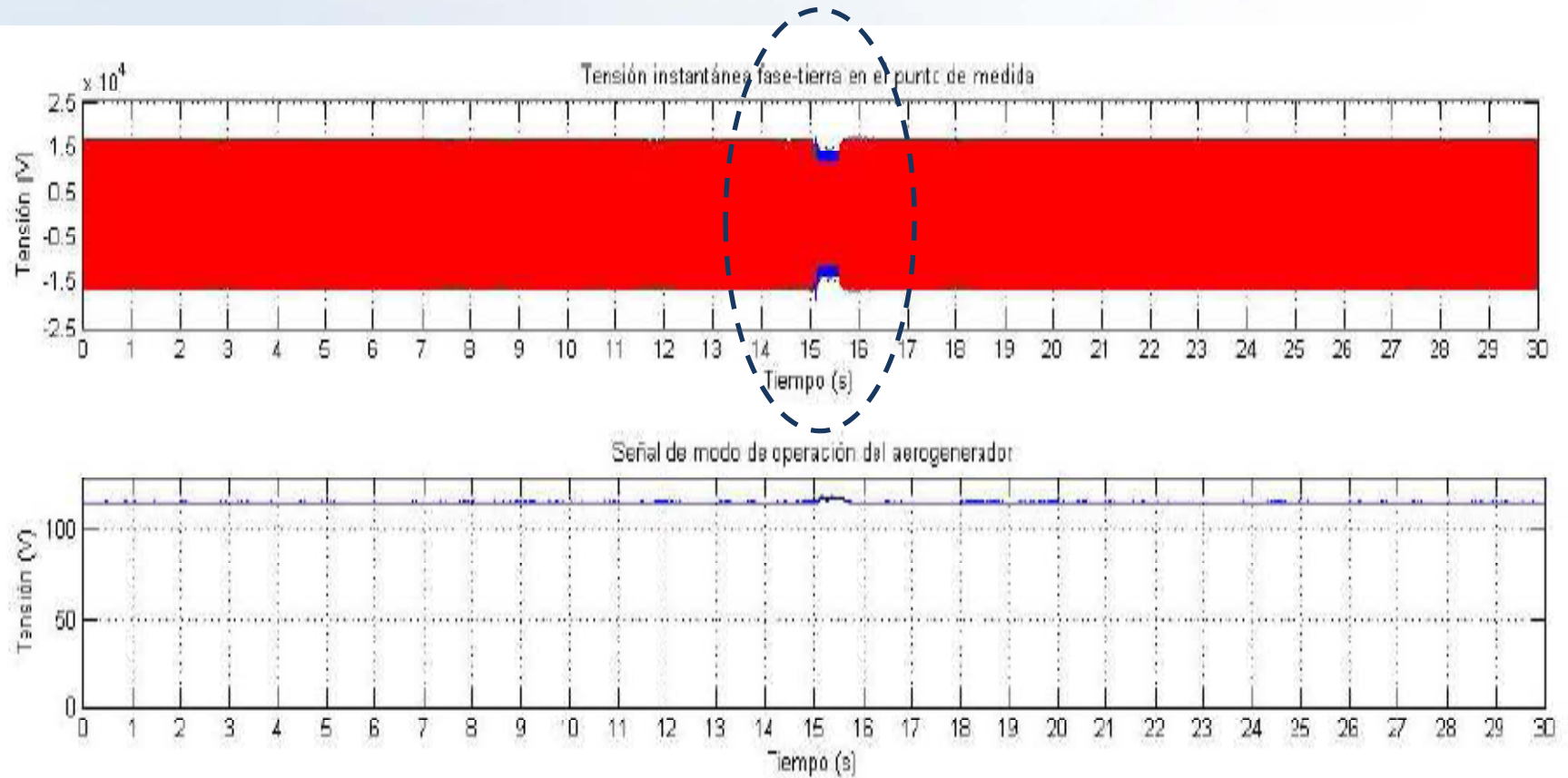
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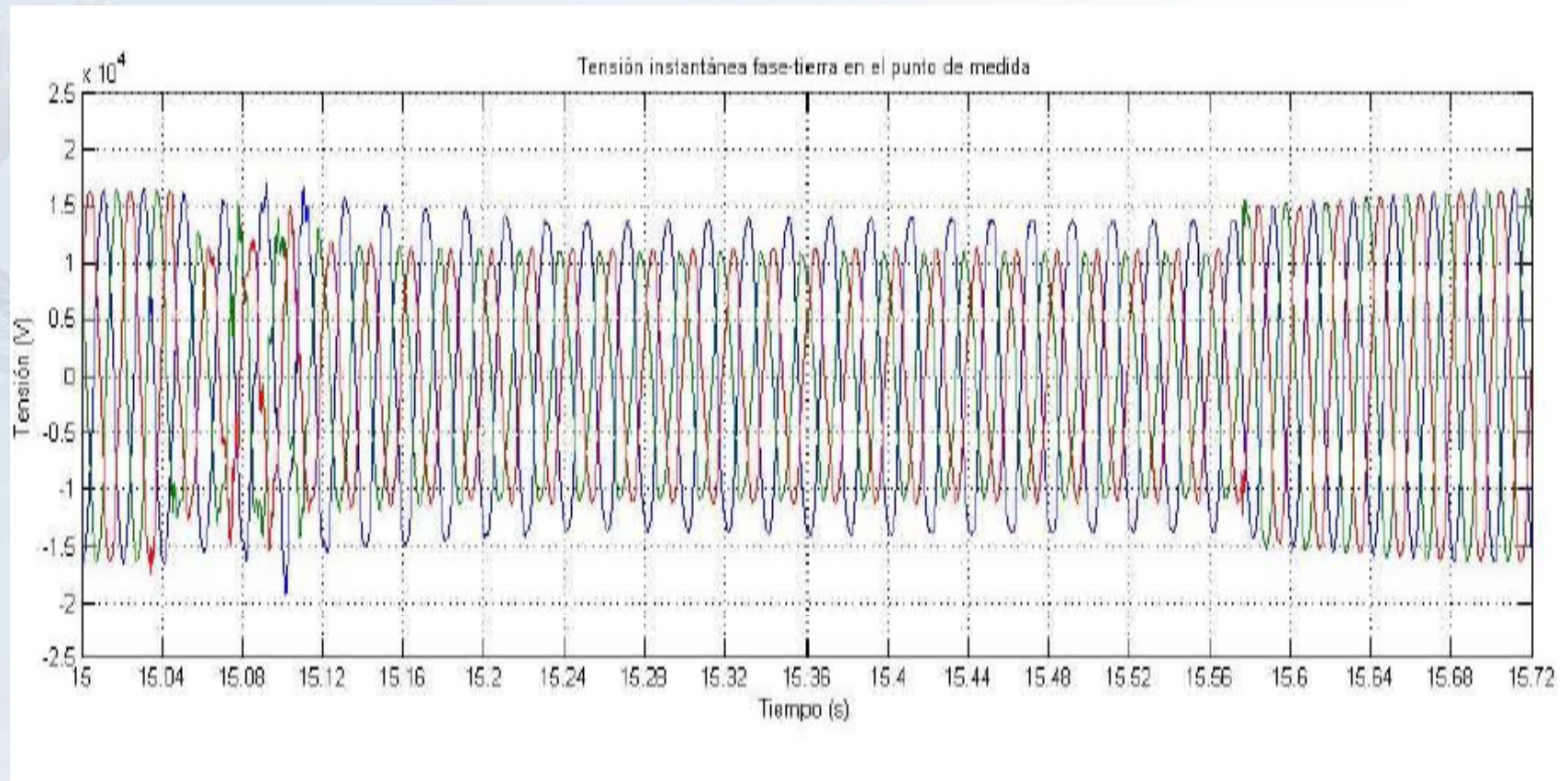
Voltage sag with Equalizer TURBO

有Equalizer TURBO的电压跌落



Voltage sag with Equalizer TURBO

有Equalizer TURBO的电压跌落



Main System Components 主要系统组件

Controller
控制器



Switching Module
开关模块

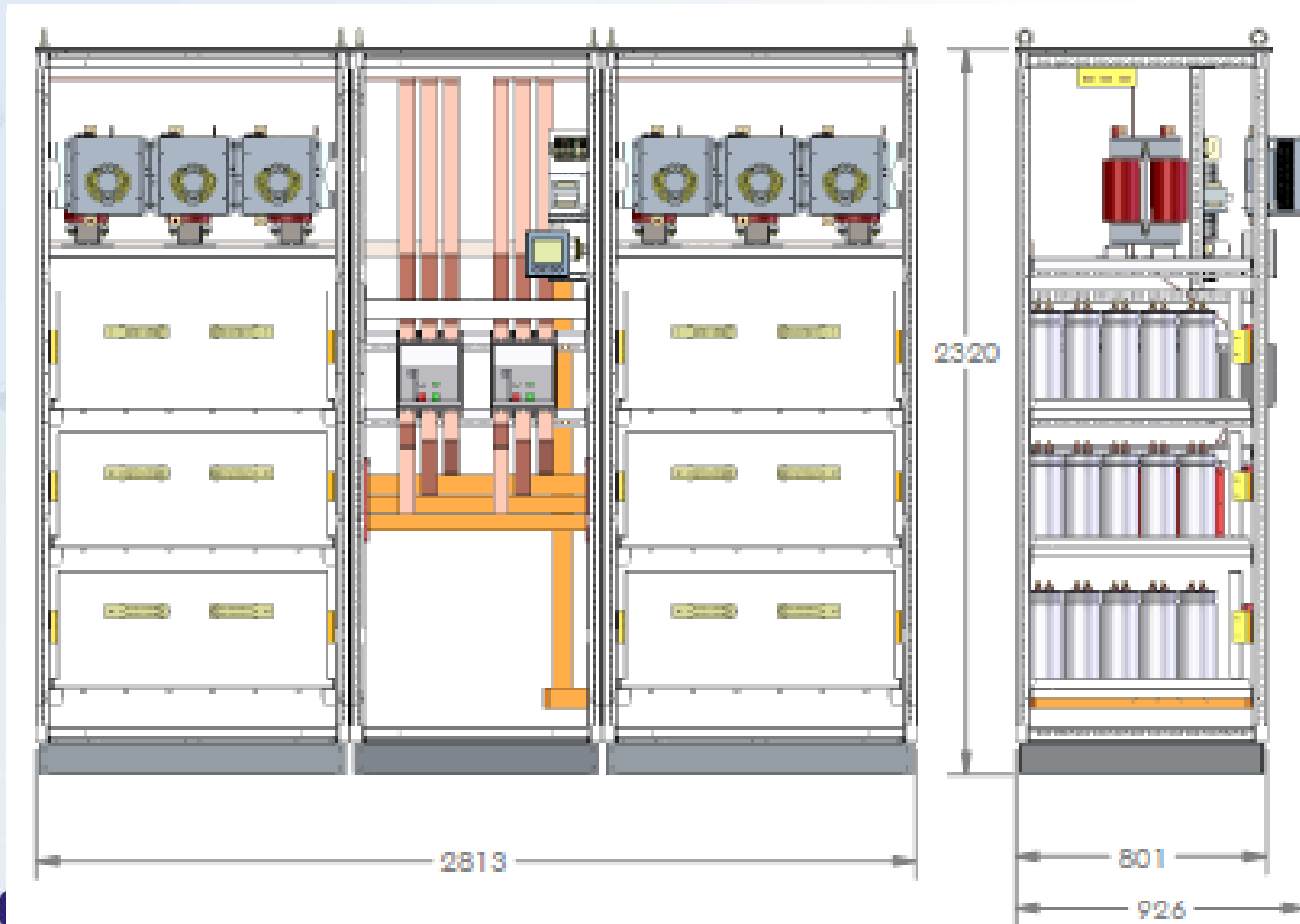


Capacitor/Inductor Module
电容器/电抗器模块

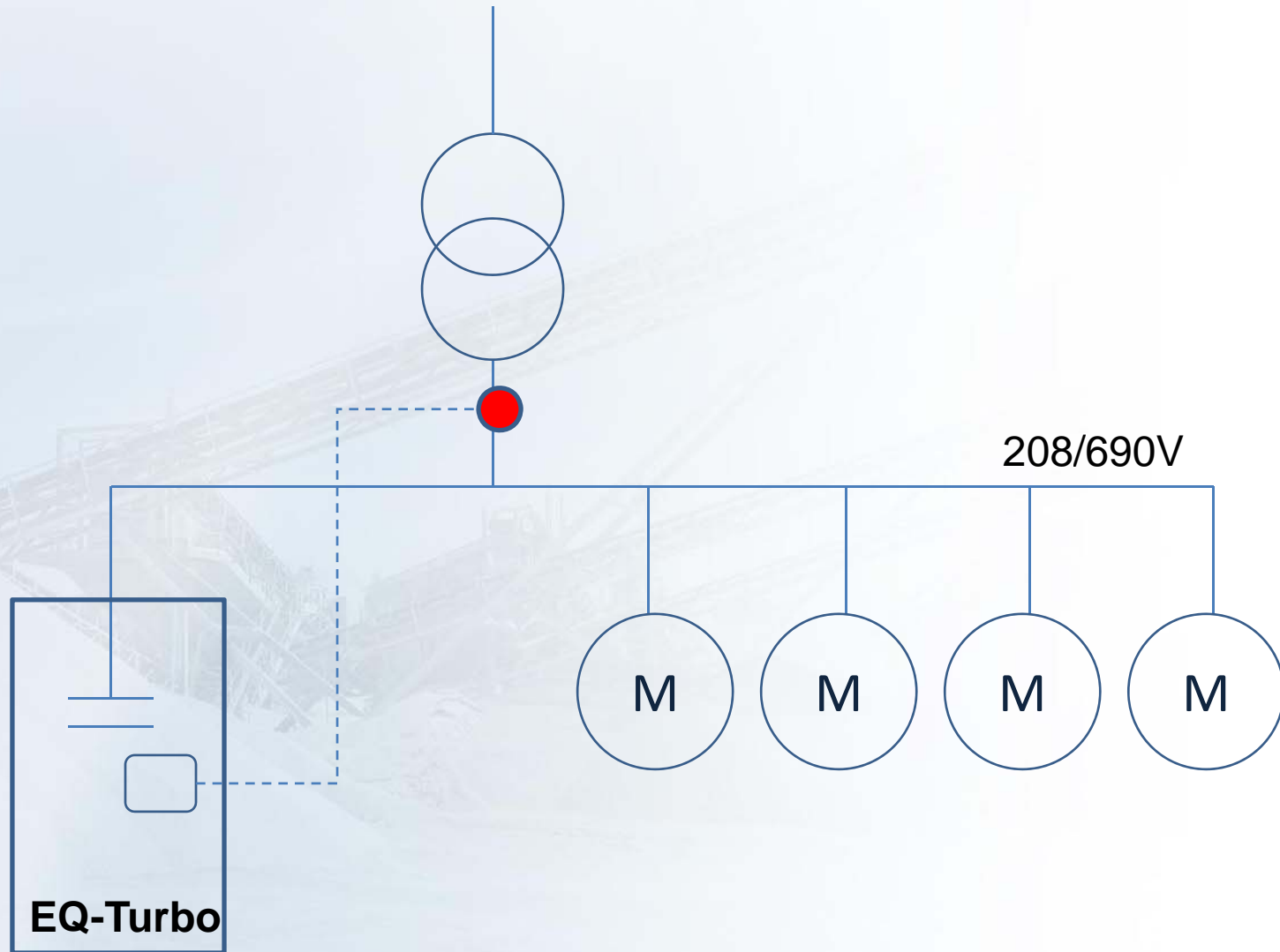


Typical 4Mvar Module

典型的4Mvar系统示意图



Installation 安装点的示意图



Potential Customers 潜在的客户

- Polypropylene industry 聚丙烯行业
- Paper Makers 造纸厂
- Semiconductor 半导体厂
- Iron and Steel 钢铁厂
- Others Place 其他敏感场合





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