



The smart compensation system

- secures high quality electrical energy
- ensures dependable technological processes
- enhances the cutting-edge quality of industrial products

Modular design:

1 master, 250 kvar power modules for series connection

Variable compensation performance

Power modules can be retrofitted at all times



5 control tasks in one piece of hardware:

- Basic version
- Inductive/capacitive power factor controller **HKOMPact PHI**
 - Harmonic compensation controller **HKOMPact OS**
- Software extensions
- Unbalance compensation controller **HKOMPact BAL**
 - Voltage stabilization controller **HKOMPact DELTA**
 - Flicker compensation controller **HKOMPact PST**

Technical data

- 250 kvar/power module
- Max. 60 kHz IGBT pulse
- Rittal system 800 x 600 x 2000 mm / module
- Water cooling
- 400 V connection

Expandable:

Network analyser can be added
Optional remote control
Can be integrated into control and management systems

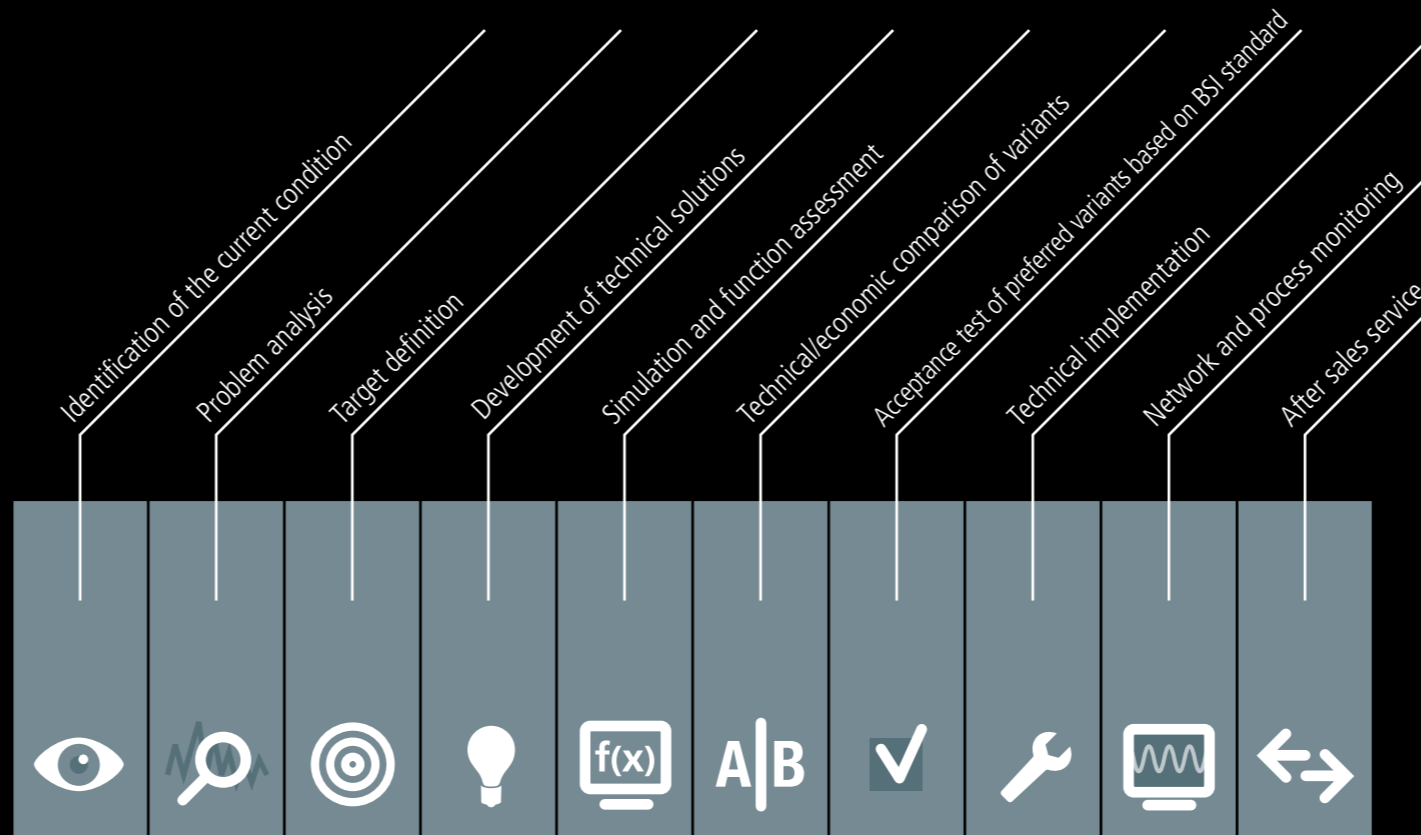
Future-proof:

Optimally adjustable at all times, can be personalized to meet the customer's requirements

Intelligent:

Automatic restart after a power outage
Regulation according to normative compatibility level
Network Resonance detection

Problem-driven solutions



No matter what service or project you are looking for, Kleinknecht offers a holistic service. We will provide an all-inclusive package for your machine or plant. If required, our service can include all the milestones in the development of technical innovations shown in the illustration above. Our service starts with the development of a specification and includes the mechanical design, network analysis and optimization, right through to

hardware and software planning. And it doesn't stop there. Our after sales service is here to help sort out any potential issues.

That's a promise.

Come and see for yourself. Feel free to contact us without any obligation:



H. Kleinknecht GmbH & Co. KG
Weimarer Straße 1 B
D-98693 Ilmenau
Phone.: +49 3677 4 69 69-0
Fax: +49 3677 4 69 69-10
E-Mail: hkompact@kleinknecht.de
Web: www.kleinknecht-group.com

www.kleinknecht-group.com/hkompact



SMART ACTIVE COMPENSATION SYSTEM

High quality electrical energy for reliable technology processes



Disturbed technology processes or poor product quality? – Companies often look to find the fault in their own production equipment. However it is often the case that insufficient electrical power quality in the power network is the true root cause.

Our Smart Active Compensation System **HKOMPact** ensures that your power networks have the required quality of electrical energy, thereby helping avoid problems such as Control failure, communication errors, faulty triggering of the safety system, damage or destruction of equipment, variable product quality, arbitrary rebooting of control and IT systems.

For instance, a prestigious manufacturer of premium cars has been using Kleinknecht compensation systems at various production locations for many years to stabilize production and enhance product quality.

The smart **HKOMPact** is here to help you improve the quality of your products too.



„The Europe-wide cost of machine damage and production loss due to poor power quality was some 10 billion Euros in 2004 alone. Total power outage is not the only threat to industrial and IT companies – insufficient power quality is a problem too. Even minor current fluctuations, excess voltages and frequency distortion can make electronic equipment fail or lead to machines malfunctioning and data being transmitted incorrectly. Sensitive equipment can even be destroyed.“

Dr. Kathrin Kirchner
Faculty of Business Administration,
University of Jena

Steel industry

*...sudden failure of drives in the roll stand, several days' standstill and the total write-off of the stand. The equipment had to be replaced...
How come? It used to work well!*

Automotive industry

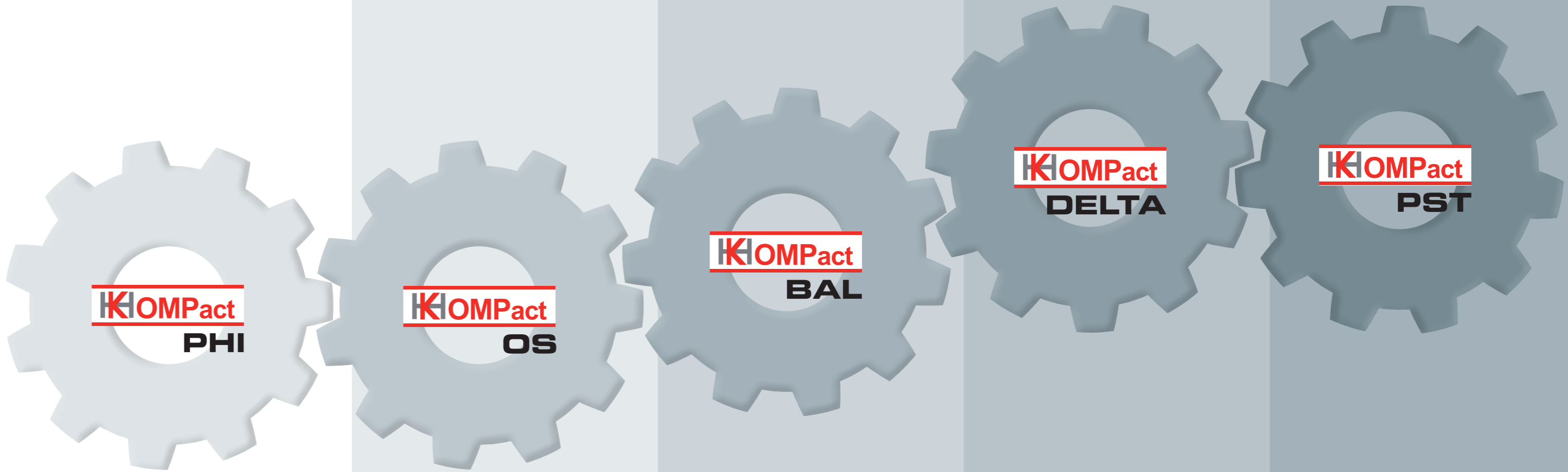
*...our large press drive motors suddenly got damaged and this led to frequent production losses.
That never happened before. What can we do?*

Pharmaceutical industry

*...We are faced with random network failures leading to damage to our lyophilisate production.
What is going on? Can you help?*

HKOMPact

Five in one: your access to constant high power quality



Inductive / capacitive power factor controller

- ▶ Highly dynamic, inductive and capacitive $\cos \varphi$ control
- ▶ Stabilization of the RMS voltage
- ▶ Minimization of cost due to reactive power

Harmonic compensation controller

- ▶ Compensation 50 - 2,500 Hz
- ▶ Regulation to voltage limit values
- ▶ Automatic frequency selection and power distribution

Unbalance compensation controller

- ▶ Compensation of unbalance
- ▶ Symmetrisation of voltage in networks with unbalanced loads

Voltage stabilization controller

- ▶ Compensation of voltage drops due to high performance consumers
- ▶ Indirect flicker compensation
- ▶ Control time < 2 ms

Flicker compensation controller

- ▶ Compensation of the effects of load fluctuations
- ▶ Intelligent „flicker compensation software on two voltage levels“

The total system compensation performance is variable and can be split among the outlined compensation tasks.