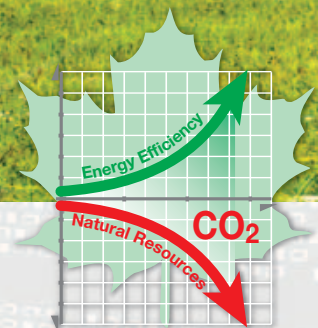


Excellent Technology, Efficiency and Quality



Telecom

FIT-FORM-FUNCTION

Retrofitting of DC power supply systems

Higher energy efficiency and lower environmental impact

Your advantages at a glance:

- increased energy efficiency
- reduction of electrical energy costs
- reduction of CO₂ emissions
- conservation of resources by re-utilizing the existing system infrastructure (cabinet, monitoring, cabling, fuses etc.)
- lower investment costs compared to new systems
- improved system availability

Modernization (retrofitting) of DC power supply systems

Today, the increase of energy efficiency is one of the most urgent challenges in many areas.

High energy efficiency is of major importance both economically and ecologically, because it not only helps to reduce costs, but also conserves resources and promotes climate protection.

Particularly in power supply systems, it is possible to achieve major energy savings by using modern and efficient products.

This also applies to the power supply systems used for information and communication technology such as rectifiers, inverters, DC converters and UPS systems. Newly developed modern power supply systems operate with a considerably increased efficiency and thus require significantly less electric energy compared to older devices.

During the last few years, the BENNING company has invested particularly in the development of highly efficient power supply systems for an energy-saving and safe operation of systems for information and communication technology (ICT).

Here, the focus was on increasing the efficiency with regard to the conversion of AC current into DC current for rectifiers and of DC current into AC current for inverters and UPS systems.

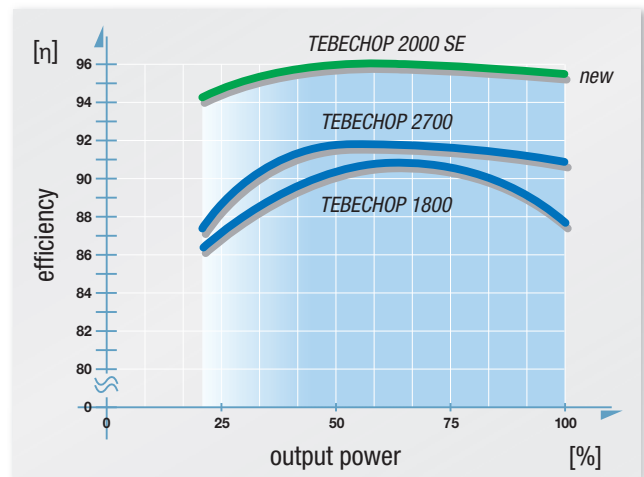
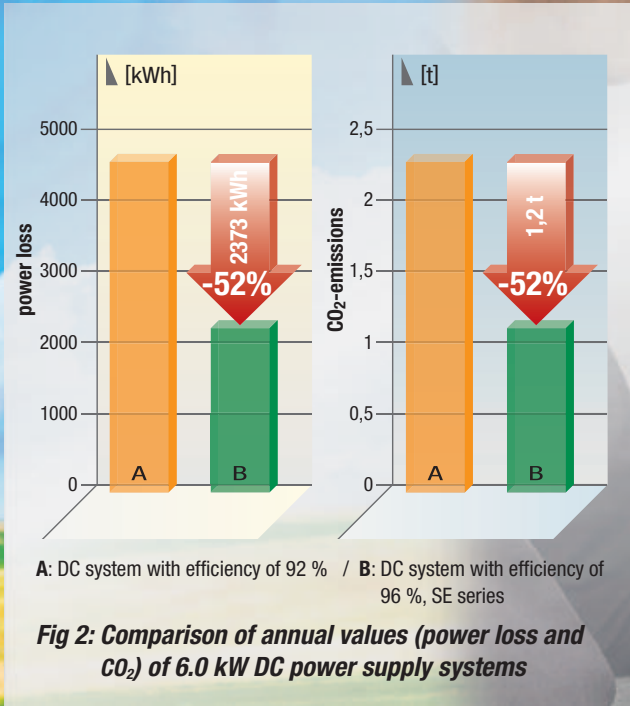


Fig. 1: Efficiency curve for different rectifier plug-in modules

With the new highly efficient rectifier series TEBECHOP SE developed by BENNING, energy is converted with an efficiency of 96 %. Older comparable devices only work with maximum efficiency values between 91 and 92 % (fig. 1).

Moreover, the efficiency curves show that the efficiency in the partial load range drops much more with older devices than with devices of the new TEBECHOP SE series.

Retrofit program reduces power loss by 52 %



Modernization program FIT-FORM-FUNCTION

Now, BENNING offers the FIT-FORM-FUNCTION modernization of existing DC power supply systems (made by BENNING) by replacing older rectifier plug-in modules with modern TEBECHOP SE devices.

Modernization is possible by easy plug & play installation without any downtime.

As shown in figure 2, the new TEBECHOP SE devices reduce the system power loss by more than 50 %.

The following example shows the possible savings regarding electric energy and CO₂ emissions of a DC power supply system after the modernization with TEBECHOP SE rectifier plug-in modules.

For a consumer load of 6,000 W, a DC power supply system with an efficiency of 92 % draws an electrical power of 6,521 W from the electric mains.

For the same consumer load and an efficiency of 96 %, the mains power consumption is only 6,250 W. The difference between both power values amounting to 271 W results in an annual saving of electric energy of 2,374 kWh.

For a purchase price of 18 cents per kWh, the annual purchase costs for energy are reduced by 427.32 €.

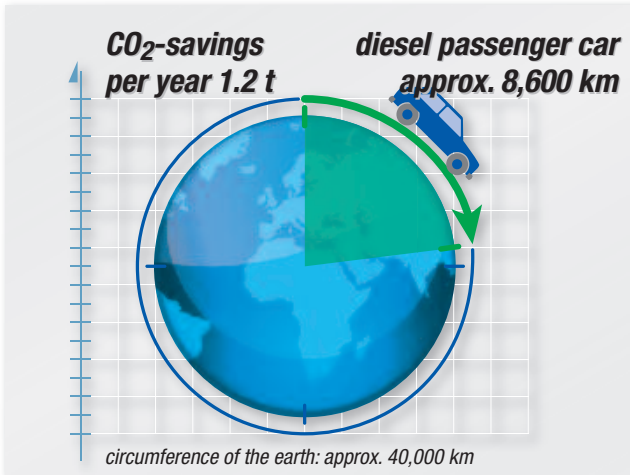


Fig. 3: CO₂-savings

By these savings, the CO₂ emissions are reduced by 1.2 t. As fig. 3 shows, this amount of CO₂ equals the CO₂ emissions of a diesel passenger car for a mileage of 8,600 km.

In parallel to the electrical energy costs saved, a modernized power supply system offers further cost advantages due to the considerably improved system availability. The use of new rectifier modules after modernization increases reliability and reduces maintenance and repair costs for the power supply system.

FIT-FORM-FUNCTION reduces energy costs



*Quick and easy replacement
without changing the system
infrastructure*

The following **TEBECHOP SE** rectifier plug-in modules are available for the modernization of **BENNING** power supply systems:

1. **TEBECHOP 2000 SE-712** rectifier plug-in module of $\frac{1}{4}$ 19" and 48 V - 40 A for the replacement of $\frac{1}{4}$ 19" rectifier plug-in modules of 48 V - 33 A
2. **TEBECHOP 2000 SE-753** rectifier plug-in module of $\frac{1}{6}$ 19" and 48 V - 40 A for the replacement of $\frac{1}{6}$ 19" rectifier plug-in modules of 48 V - 50 A
3. **TEBECHOP 12000 SE-127** rectifier plug-in module of 19" and 48 V - 225 A for the replacement of older rectifier plug-in modules of 48 V - 225 A with the same mechanisms and connection configuration.

Retrofitting of the rectifier systems by means of the rectifier plug-in modules listed under item 3 requires wiring work in the rectifier cabinet (addition of neutral conductor).



Fig. 4: Rectifier plug-in modules for the FIT-FORM-FUNCTION modernization program

FIT-FORM-FUNCTION increases system availability



Fig. 5: TEBECHOP 2000 SE-753,
48 V - 40 A



Fig. 6: TEBECHOP 2000 SE-712,
48 V - 40 A



Fig. 8: TEBECHOP 12000 SE-127,
48 V - 225 A

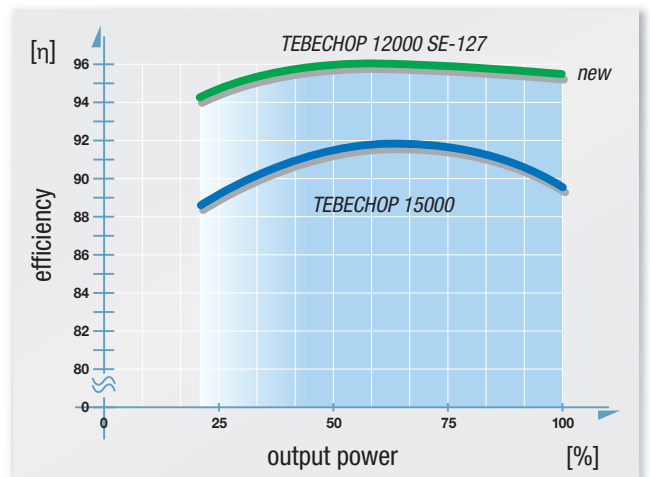
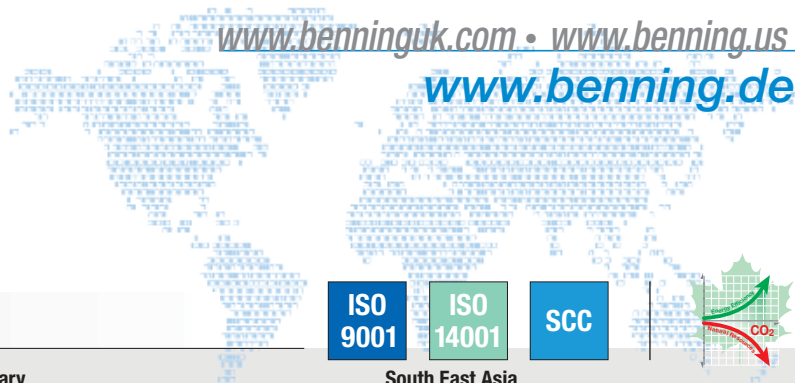


Fig. 7: Efficiency curve for different rectifier plug-in modules

For the modernization of systems with three-phase rectifier plug-in modules (fig. 8), it has to be verified whether the neutral conductor exists up to the mains connection of the plug-in module, because the use of devices of the TEBECHOP SE-127 series requires a neutral conductor.



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