

# TC.GSS Short description

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## Keywords

TC.GSS, Bidirectional Power Supplies

## Abstract

The formula seems to be as simple and logic as that! Just take a high-quality and established DC power supply and add a mains input circuit for refeeding and you will get a bidirectional source/sink-system. This may sound very easy to achieve but the way to reach this goal certainly is a long and stony road being very complex, especially as this system shall be expandable on a modular basis offering the user a maximum amount of flexibility regarding voltage, current and power levels. By developing the new generation of TopCon TC.GSS, Regatron AG has created an extraordinarily compact and modular source/sink-system. This new system is equipped with the well-known and outstanding capabilities the TopCon QUADRO DC power supplies offer. Furthermore, it has been combined with an input topology enabling comprehensive feeding back and finally the implemented Power Factor Controller for perfect grid current waveforms.

## TC.GSS – an overview

Input	3 x 400VAC 3 x 63A
Soft Start	integrated
DC Voltages	65/ 130*/ 400/ 500/ 600VDC
DC Power per module	20/ 32kW DC
DC Currents bidirectional	600/ 308/ 100/ 80/ 66A @32kW 385/ 192/ 63/ 50/ 40A @20kW
Master Controller	U/ I/ P/ Ri
Digital Resolution Variable	12 Bit
Analog Resolution	0.025% FS
system control via	- HMI (see figure 1)/RCU - TopControl software - Analog Interface - RS-232 and other digital interfaces



Figure 1: TopCon TC.GSS, 32kW bidirectional in one module

## The control concept

The system's completely digital architecture not only facilitates an optimal interaction of the single hardware components among each other. It is rather the basis for the extraordinary universalism, the TopCon product family offers. Digital control circuits stand out for a perfect reproducibility. Moreover they allow the adaptive changes to be parameterised, a fact that allows a robust control of even complex loads. Not only the TopCon QUADRO DC power supplies but also the TopCon TC.GSS units are equipped with a real-time process management working completely time consistent. By means of communication processors the control structure is connected to peripheral bus systems thus enabling a control management of even more powerful TC.GSS units in a multi system. Freely programmable limiting values and alarm functions, a comprehensive error management system as well as the logbook function are completing the package of features available.

### The integrated function engine TFE

By the use of state-of-the-art signal processors the generation of discrete signals such as impulses, pulse sequences or bursts is not a problem at all. The user is enabled either to directly select from the standard pulse forms or else to parameterise the time sequences without any restriction. The fade-in and fade-out characteristics can be programmed as well as the repetition of any pulse pattern. Editing, saving and selecting of curve progressions or the import from spreadsheet programs are a useful tool for data management onboard or from an external device. The curves can be assigned as set values to any control system, thus expanding the application range considerably.

### Innovative and specific: application area programming

The integrated function engine's structure moreover allows for a completely new way of onboard data management: the application area programming. In this operation mode the TFE does no longer work in a time related but rather in a functions related mode. One of the system factors such as DC current / voltage / power is assigned to another factor by means of a functional relationship. This interrelation can be realised by means of a graphic curve or a value table. Thus the user is enabled to define nearly every characteristic of a two-terminal circuit by using a transfer function. A current example would be the highly precise simulation of solar panels, in the case of which the existing voltage defines the output current.

### Unique and versatile: multi use possibilities

One of the most outstanding characteristics the TopCon TC.GSS systems offer is the unique multi use possibility

- serial connection for doubling / tripling the voltage
- parallel connection for multiplication of the system current
- matrix connection for mixed parallel/serial connection
- multiloop connection for common control of several autonomous source/sink systems.

Due to these possibilities, the units offer a wide range of applications to be used for and the user is enabled to continuously adapt his system by combining units to the current requirements.

The typical fields of application are as follows:

- battery and storage systems: testing and cycling
- battery simulation: testing of electrical power trains and auxiliary systems, simulation of onboard and storage systems
- laboratory and testing use: solar simulation, simulation of capacitive storage and fuel cells, EDLC's, railway engineering and finally materials handling technology

For all these fields of application Regatron develops and delivers specific user programs enabling an advanced system automation.



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