HAEFELY HIGH VOLTAGE TEST

GC 223

Impulse Generator Control Module

The Generator Control Module GC 223 allows comfortable and flexible control of an impulse generator system.

The control system GC 223 is a result of our close collaboration with worldwide impulse test systems users and reflects our experience in high voltage testing of more than 50 years.

The hardware of GC 223 is based on well established Haefely in-house developments. Only durable and well protected components, specially adapted to a demanding high voltage environment, have been used.

The GC 223 instrument can be connected with an impulse measurement device (DiAS, HiAS or DMI) to form an integral impulse control and measurement system. The GC 223 can also be fully remote controlled via RS 232 interface by a computer to integrate the system into a complete manufacturing chain.

The GC 223 system supports manual operation as well as automated test sequences. The software menu is especially designed for intuitive, fast and safe user interrogations. It is equipped with a 5.2'' liquid crystal display and a numerical keypad.

The basic version of the GC 223 includes all necessary functions to control an impulse system. The instrument can be upgraded with programmable test sequences and a remote control software.

The GC 223 is primarily intended for use in automated test bays which are controlled by a host computer. Beside this the instrument can also be applied for stand alone impulse generators which do not require an embedded solution.

Beside the control module GC 223 Haefely also offers a more sophisticated impulse generator control system GC 257.

The system is equipped with an industrial PC which provides a Windows based control software with full visualization of the test procedure, measuring values and warnings or alarms. For more information please contact us.

FEATURES

- **Control unit** for operating an impulse generator. It provides control for the charging and triggering process of an impulse generator.
- **Charging Control Unit** suppresses interferences and minimizes wiring by collecting all control and data lines from the generator into two main cables.
- **Integration of measuring device** and adaptation of its measuring values for efficiency calculations.
- **Chopping gap control** allows all necessary adjustments for chopping lightning or switching impulses
- **Large graphic display** and buttons marked with clear symbols simplifies operation and supports quick and easy access to all functions and parameters.
- **Safety features** are implemented in hardware independent of any software. Additional switches, lamps and horns can be placed in optimal positions.

Optional:

- **Programmable test sequences** optimized for automated production testing.
- **Remote control software** to operate the unit from a computer.

BENEFITS

Easy and safe reduce the learning curve and minimizes any dangerous situations.

Rugged and compact guarantee high durability and helps reducing the installation costs.

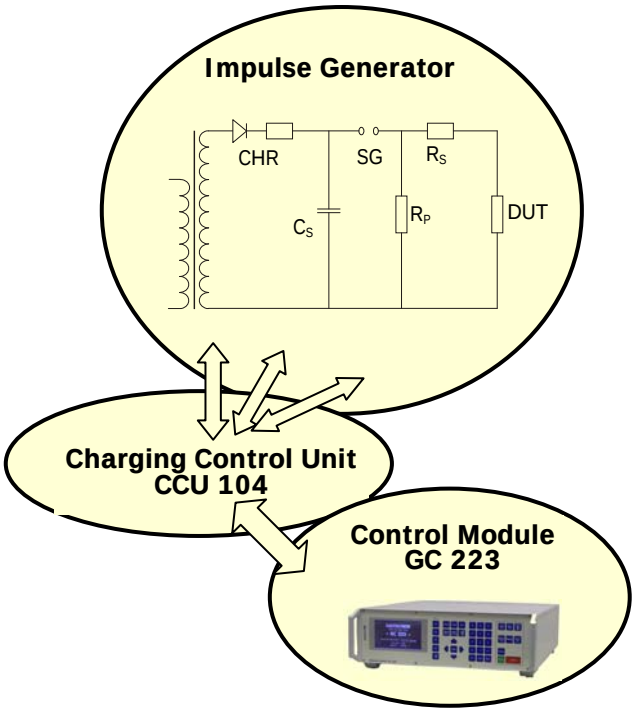
Versatile and compatible support easy integrating into a manufacturing chain.

Lowest cycle time ensures that even the highest factory throughput can be accomplished.

APPLICATIONS

- Transformer Testing
- Switchgear Testing
- Surge Arrestor Testing
- Research and Development

SYSTEM DESCRIPTION



The Charging Control Unit CCU 104 is the front-end interface to the impulse generator. It is a standalone box which powers the impulse generator and which collects all control and measurement lines from the impulse generator.

The control module GC 223 is connected by two AMP connector cables. The 24 poles cable is for analogue signals and the 37 poles cable for digital data.
The GC 223 instrument acquires the measured data from the CCU104 and sends control commands to operate the impulse generator. All parameters are clearly displayed on the screen and are easily accessible over the buttons on the front panel of the GC 223.

The charging control unit CCU 104 is attached to the charging rectifier at the impulse generator. Basically the CCU 104 delivers the supply for energizing the impulse generator as well as controlling the front-end signals to the charging rectifier, gap motors, grounding system, etc.

The modular architecture of the generator control system allows minimal wiring and suppresses interferences most effectively. Due to the separation between connection box and control module it is also very easily to upgrade or retrofit an instrument without replacing the whole system.

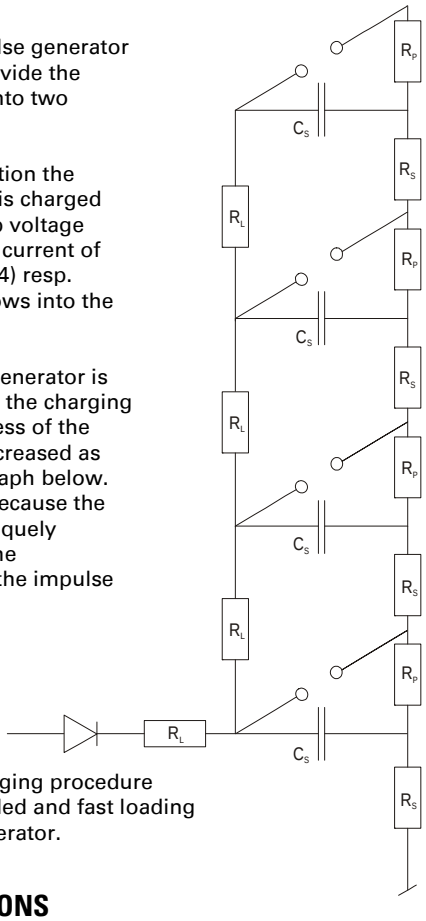
Haefely Test offers charging control units for virtually any size and type of impulse generator. The CCU 104 can deliver a charging current of up to 90 A. For impulse generators with more than 340 kJ energy we recommend to use the CCU 105 with a charging current up to 200 A

CHARGING PROCEDURE

To charge an impulse generator it is necessary to divide the charging process into two sections.

During the first section the impulse generator is charged by applying a steep voltage ramp. As a result a current of up to 90 A (CCU 104) resp. 200 A (CCU 105) flows into the generator.

After the impulse generator is loaded with 95% of the charging voltage the steepness of the voltage ramp is decreased as illustrated in the graph below. This is necessary because the charges are not uniquely distributed along the different stages of the impulse generator.



The described charging procedure guarantees controlled and fast loading of the impulse generator.

DKD CALIBRATIONS

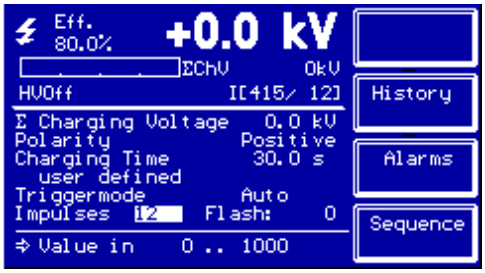
For reference voltage measurements Haefely Test can provide you with DKD certificates, which are traceable to highest national and international standards as required in the ‘standards’ family” ISO 9000 and the ISO/IEC 17025..

Calibrations carried out by DKD (German Calibration Services) allow the user to trust in the reliability of measurement results. They increase the customers’ confidence and competitiveness in the high voltage measurement field.

CONTROL MENU

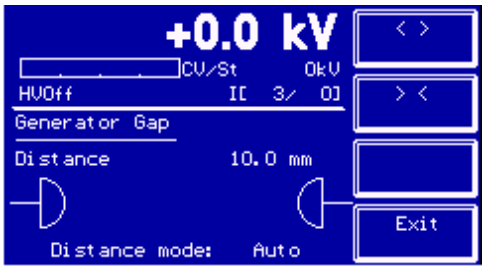
The control menu of the GC 223 takes care of adjustments used to perform daily tests with the impulse generator. Following parameters can be edited:

- **Charging voltage:** per stage, in total or, if an additional measurement device is installed, the actual voltage at the test object
- **Polarity:** positive or negative with clear display of the polarity change
- **Charging time:** minimal or user-defined
- **Trigger mode:** manual, automatic or external
- **Counter:** number of impulses and number of flash-overs when using an external measurement device
- **History:** information on previous impulses
- **Alarms:** display of alarms, warnings
- **Trips:** max. charging voltage, primary current
- **Chopping:** delays, phaseshift, CRO



GENERATOR GAP MENU

The generator gap menu allows all necessary adjustments for controlling a generator gap. The settings are clearly displayed graphically which improves understanding and makes operation safer.

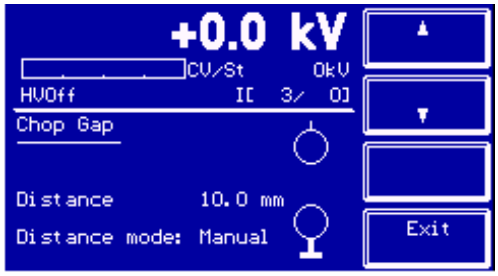


Normally the gap distance is set automatically. This is indicated by the message 'Distance mode: Auto' at the bottom of the window. If the distance is changed manually the difference from auto- to actual-distance is shown. The distance is only displayed when the difference is larger than the stop range.

CHOPPING GAP MENU

In this menu the chopping gap distance can be adjusted for chopping lightning or switching impulses. Normally the distance is set automatically according to the selected test voltage, chopping delay and the measured efficiency factor.

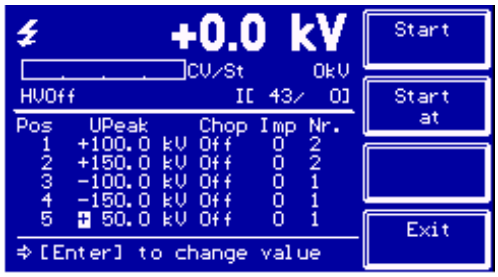
For front chopped impulses or for distorted impulses it is necessary to adjust the chopping gap distance manually. The GC 223 will clearly conduct the user through the adjustment process and will display the settings graphically.



TESTE SEQUENCES (OPTIONAL)

With this option an execution of automated test sequences can be performed. A sequence of up to 20 steps can be stored and executed.

The sequence can be started at any position and it can be paused or interrupted at any time.



REMOTE CONTROL (OPTIONAL)

The remote control option of the GC 223 can be used to connect the instrument with a computer or a laptop. All functionalities are also available by remote control. An application would be the integration in an automated test field, e.g. mass production and testing of distribution transformers controlled by an external host computer. For host control we recommend optical fiber links between host and computer and GC 223.

OPTIONS

Name	Description	Ordering No.
GC 223 REMOTE	Software for Remote Control	2482733
RS232 LINK	RS 232 Data Cable for Remote Control	2479211
GC 223 SEQ	Software for Programmable Test Sequences	2482743
DMI 551	Digital Measuring Instrument	2474871
HiAS 743	High Resolution Impulse Analyzing System	2497431
DiAS 733	Digital Impulse Analyzing System	2497451

SCOPE OF SUPPLY

Impulse Generator Control Module
GC 223 in a 19'', 3 HU, desktop housing.
Included in the standard delivery are
control cables (20 m), connection box (CCU 104),
separate emergency switch, manuals
and certificates.
Ordering No.: 2387490

TECHNICAL SPECIFICATIONS

Controlled Parameters

Charging voltage	per stage, in total
Charging time	minimal, user-defined
Polarity	positive, negative
Triggering	manual, auto, external
Chopping	delays, phaseshifts, CRO
Gap distances	manual, automatic
Test voltage (optional)	if measuring device is attached

Charging Current

CCU 104 (standard)	25 A or 90 A
CCU 105 (optional)	200 A

Power Supply

Line voltage	115/230 V AC
Line frequency	50 / 60 Hz
Power consumption	30 W

Environmental Conditions

Operating temperature	10 ... 40° C
Humidity range	35 ... 85 % r.h. non-condensing

Interfaces

Digital I/O	24 V
Analogue I/O	0 ... 10 V
External trigger	triggering from external signal
Gate 95% trigger	triggering of camera shutter
CRO interface	triggering of external CRO
AC synchronization	synchronize to AC voltage
Serial interface 1	connecting measuring device
Serial interface 2	remote control by computer
Parallel port	attaching printer
Safety interlock	
Emergency button	
Warning lamp	
Warning horn	
Auxiliary input	
Ground	

Weight and Dimension

Weight	15 kg
W x H x D	450 x 135 x 350 mm

www.haefely.com

Europe, Asia, South & Central America, Australia
Haefely Test AG
Birsstrasse 300
4052 Basel
Switzerland
☎ + 41 61 373 4111
🖷 + 41 61 373 4912
sales@haefely.com

China (Sales & Service Office)
Haefely Test AG – Beijing Office
8-1-602, Fortune Street
No. 67, Chaoyang Road, Chaoyang District
Beijing, 100025
P. R. China
☎ + 86 10 8578 8099
🖷 + 86 10 8578 9908
sales@haefely.com.cn

North America
Hipotronics Inc.
1650 Route 22
PO Box 414
Brewster, NY 10509
USA
☎ + 1 845 279 3644
🖷 + 1 845 279 2467
sales@hipotronics.com