KIT 4.0

High Voltage Construction Kit

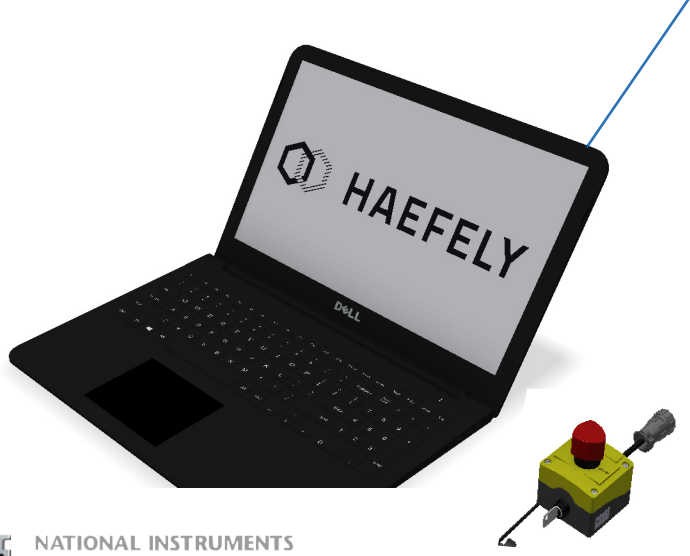
HAEFELY

Current and voltage – our passion

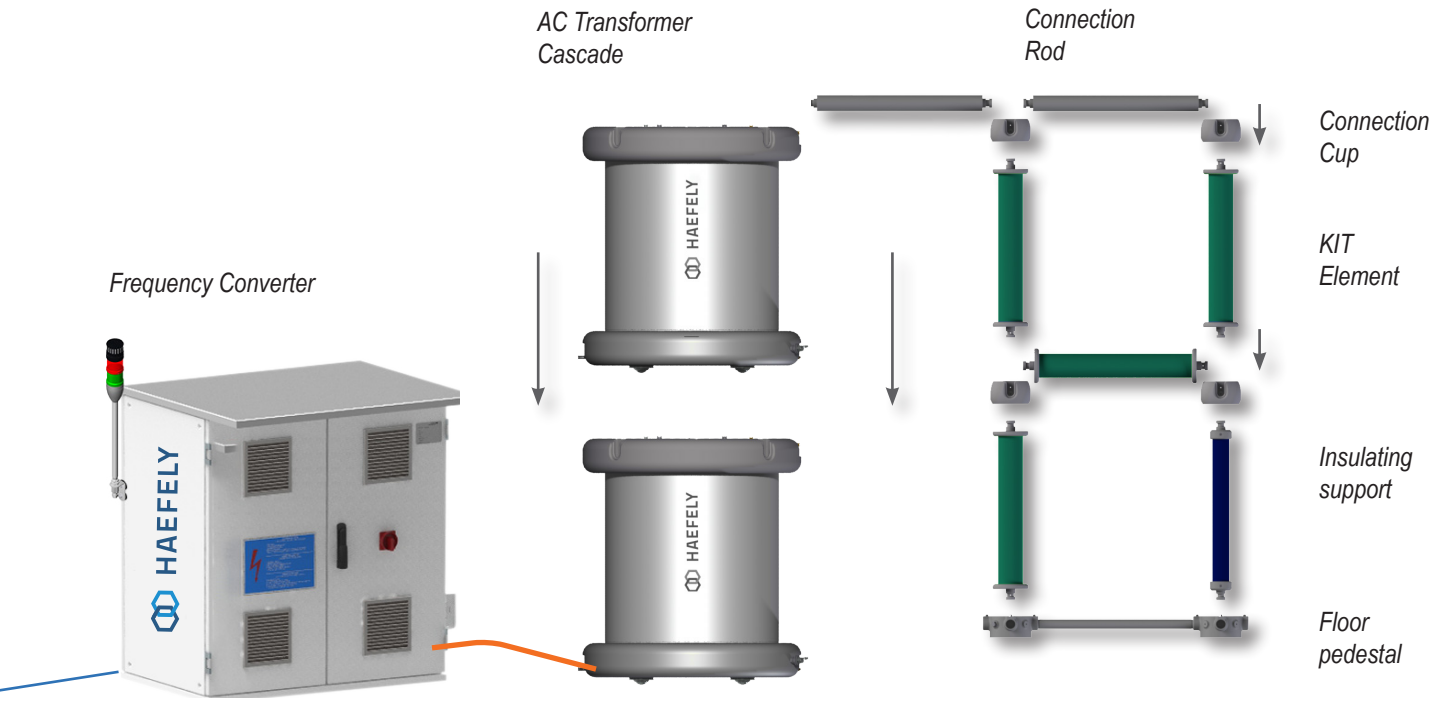
The **KIT 4.0** is a high voltage system made of easily configurable elements. Due to its modular design, it is the ideal tool kit for conducting experiments in an university, in a R&D lab, or for a research application. A variety of experiments are possible with the generated AC, DC, and impulse voltages. Configurations are not only easy to put together, they occupy very little space. A fully assembled experiment occupies an area of 12 m2 and a volume of approx. 30 m3.

KIT 4.0: NEW GENERATION, LATEST TECHNOLOGY

The HAEFELY High Voltage Construction KIT 4.0 integrates state of art technology, offering variable frequency experiments to students with safety SIL 3 certification. It integrates a frequency converter front end, digital oscilloscope for voltage and current measurements, and a completely refreshed accessories set. All components have their own NI LabVIEW function block, making the KIT modular in software as well as in hardware. Lab-VIEW a market leader, is a system-design platform and development environment for visual programming language. This software add-on enables new possibilities and greater flexibility such as automated test sequences with data recording.



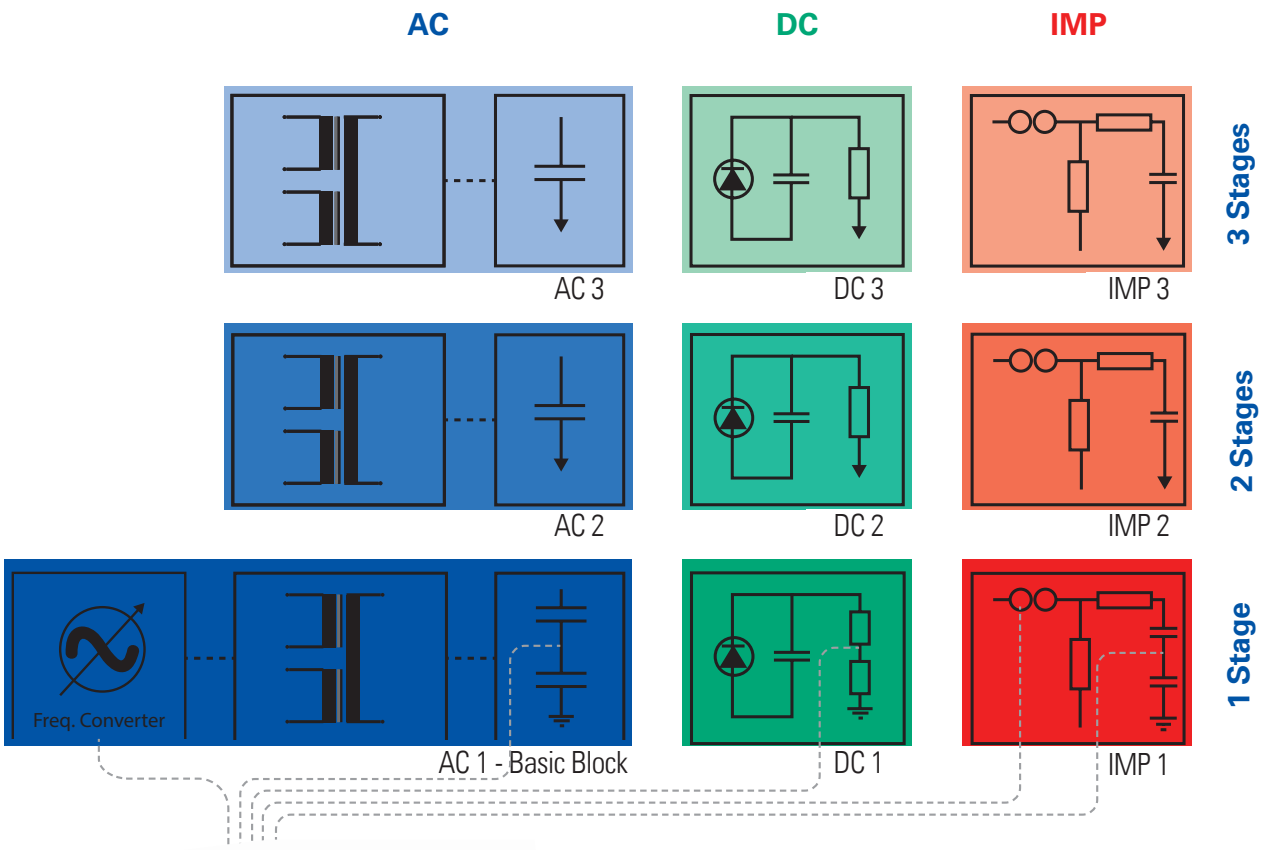
NATIONAL INSTRUMENTS
LabVIEW



QUICK & EASY SETUP

The configuration is built up by inserting different KIT elements into connection cups or floor pedestals to form a self-supporting arrangement. Every connection cup has two vertical and four horizontal connection possibilities. All components have the same length and the same mechanical mating. No additional tools are required. Thanks to this simple but sophisticated design, the user can create and recreate his setup quickly and efficiently.

The frequency converter, the measuring path, and all active accessories are controlled via the LabVIEW platform (modular visual programming).



MODERNIZATION & SERVICES

Get the latest testing possibilities with your existing KIT system by upgrading key elements,such as front end and measurement equipment.

HAEFELY TRENCH
HIGH VOLTAGE TECHNOLOGY

HAEFELY
HIGH VOLTAGE TEST

AC	DC	IMP	
300 kV AC AC 3 AC 2 AC 1	400 kV DC DC 3 DC 2 AC 1 DC 1	400 kV IMP IMP3 IMP2 AC 1 DC 1 IMP1	3 Stages
200 kV AC AC 2 AC 1	280 kV DC DC 2 AC 1 DC 1	280 kV IMP IMP2 AC 1 DC 1 IMP1	2 Stages
100 kV AC AC 1	140 kV DC AC 1 DC 1	140 kV IMP AC 1 DC 1 IMP1	1 Stage

Example of KIT 4.0

300 kV AC
280 kV DC
400 kV IMP

AC 3 IMP3
AC 2 DC 2 IMP2
AC 1 DC 1 IMP1

KIT 4.0 CONFIGURATION

The KIT 4.0 configuration is modular and can be extended at anytime. Configuration tables below give an idea of the possibilities from 1 to 3 stages for AC, DC and Impulse setup. The AC 1 block is the basic block, which will include a 100 kV AC transformer, a frequency converter cabinet with the control unit . Additional blocks, such as AC 2, 3, DC 1, 2, 3 and IMP 1, 2, 3 can be added to complement the AC 1 block depending on testing needs.

WHICH SYSTEMS CAN BE UPGRADED:

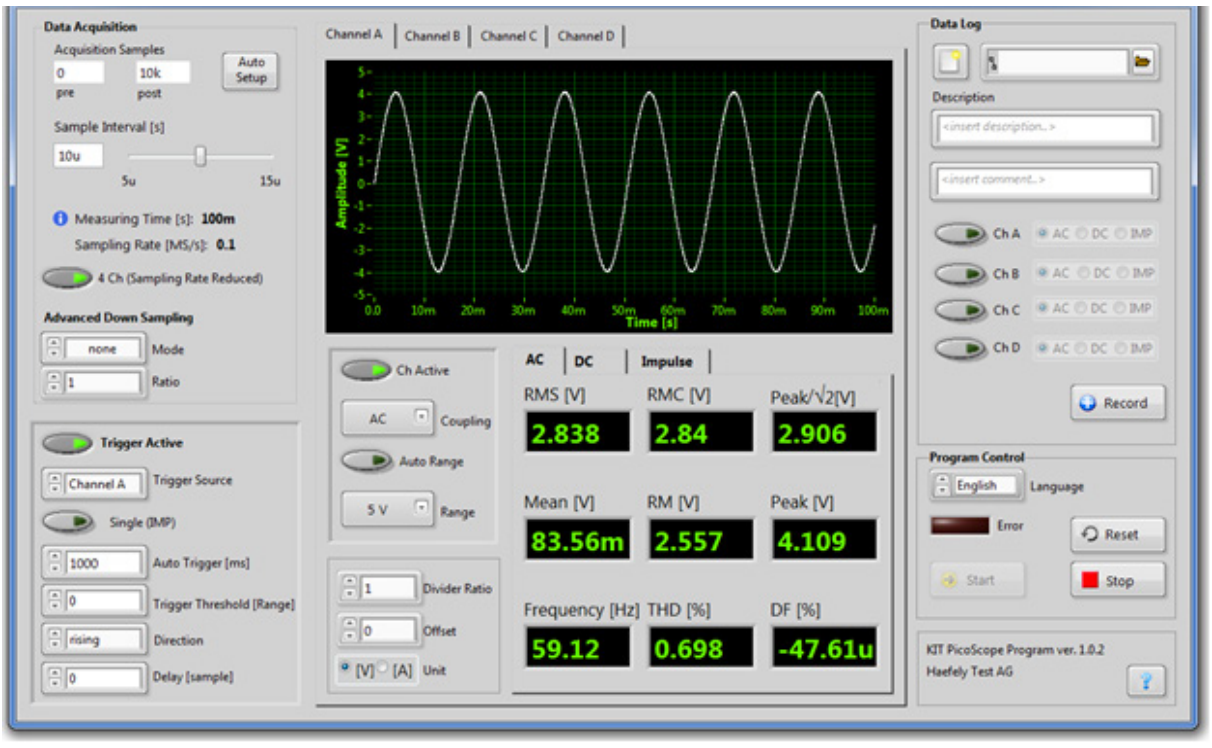
■ Previous generations of HAEFELY high voltage construction KIT and any other "KIT" system compatible with the standrd MWB Bamberg System

HAEFELY HIPOTRONICS

HIGHEST QUALITY HARDWARE & PREMIUM CHOICE SOFTWARE

Get further testing possibilities with frequency converter front end and laptop controlled system using LabVIEW development environment:

- Database - *Accessible*
- LabVIEW - *Compatible*
- Software - *Customizable*
- Variable Frequency Power - *Supplied*
- Safety SIL 3 Power Supply- *Certified*
- PD Measurement - *Compatible*



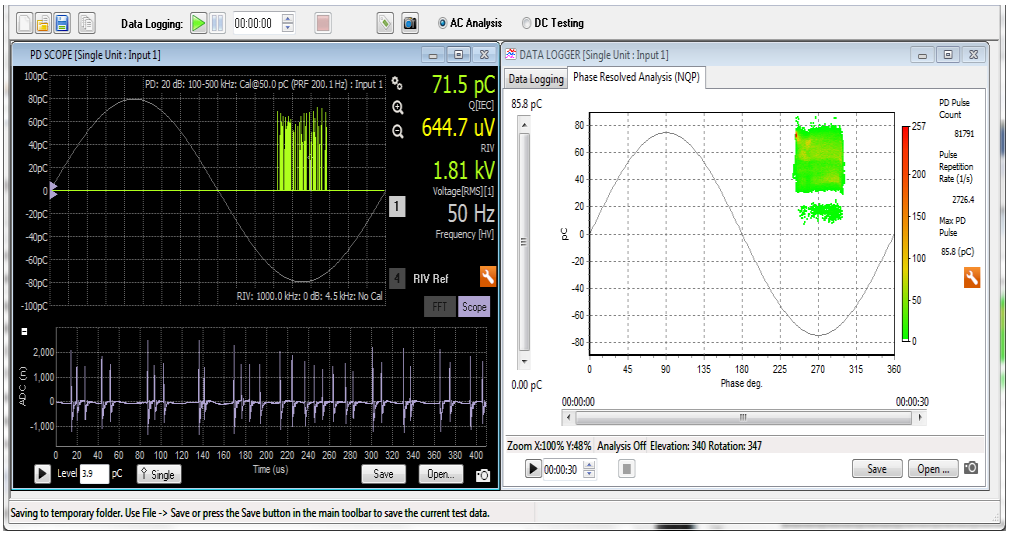
NATIONAL INSTRUMENTS LabVIEW

LABVIEW CONTROL

The KIT 4.0 is remote controlled from a laptop (optional) and is delivered with a standard program, which allows operating the system for each configuration. In addition to this, all components have their own LabVIEW function block (library is available as an option). LabVIEW is a visual programming language; it integrates a system-design platform with development environment. This add-on enables new possibilities and greater flexibility, such as automated test sequence with data recording.

- Standard system operation program included - ***System ready to use*** *
- LabVIEW functions block available - ***System customizable***
- Intuitive graphical programming, using graphical constructs - ***Easy to learn, use andmaintain***
- Possibility of interfacing with third party tools such as MATLAB, Maple, MathCAD, Scilab, MS Accessa and Excel - ***Expands analysis and visualization functions***

**** LabVIEW must be available***

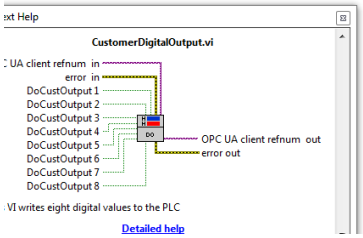


PARTIAL DISCHARGE MEASUREMENT AC & DC

With the partial discharge filter option, background noise generated enabling partial discharge measurement for the AC and DC setups. As addition to the filter option, the PD measurement set is available with coupling capacitor, partial discharge detector and calibrator.

- AC and DC Mode - ***Enabled***
- Built in frequency spectrum analysis and selectable frequency band- ***Reduces ground***
- ***noise***
- Phase resolved analysis - ***Expanded PD Interpretation***
- Analog output (signal, filter and trigger) - ***Expanded possibilities***

KIT 4.0 OPTIONS



LABV FB - LABVIEW FUNCTION BLOCK LIBRARY - 3714555

LabVIEW library including function block for each KIT component.

PICO- PICOSCOPE 3404D - 9782724

4 Channels, USB-powered digital oscilloscope supplied with LabVIEW function block and LabVIEW sample program to read parameters from the AC, DC and Impulse KIT setup

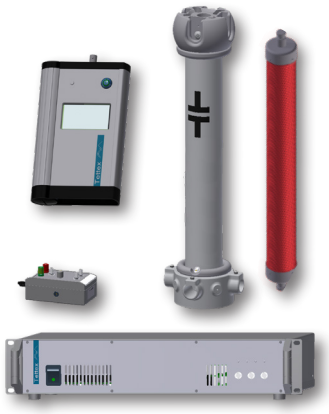
NK/100/100- STANDARD CAPACITOR 100 PF, 100 KV- 3259370

SF6-insulated standard capacitor for loss factor measurement or accurate voltage measurement. It can be used together with a C & tan delta measuring bridge (e.g. Tettex Instruments 2840) for high accuracy measurements of the capacitance and tan delta of HV equipment.

RIP - DC RIPPLE MEASUREMENT - 3714451

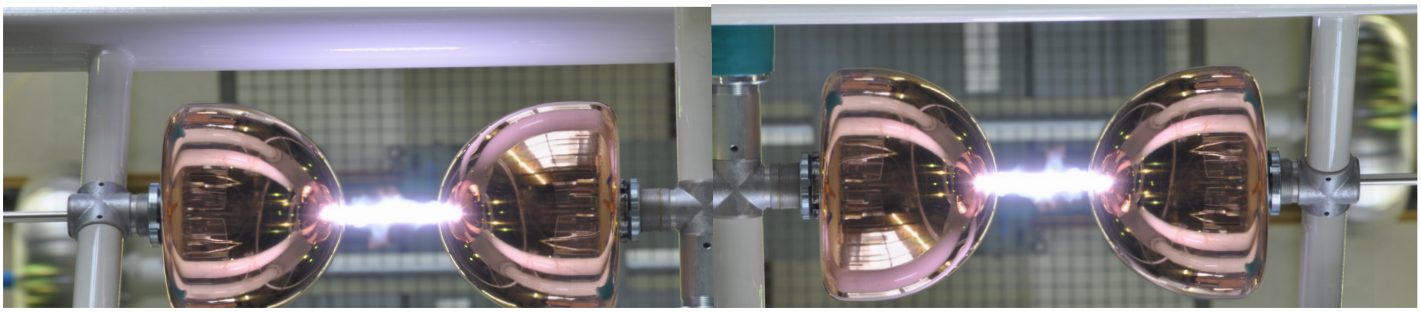
RC arrangement to enable measurement of the DC ripple. One set per stage is necessary.

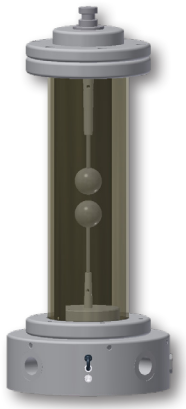
This option is included in the IMP 1, IMP 2 and IMP 3 packages.



PD MEAS - PD MEASUREMENT SET - 3490078

This set includes the necessary components for the PD measurement. It includes the DDX 9121b measuring instrument, the KAL 9510 calibrator, the coupling capacitor, the blocking impedance, and the AKV 9310 measuring impedance.





DKU - PRESSURE TEST VESSEL - 3714360

Pressure and vacuum vessel to determine breakdown voltages of electrode arrangements as a function of vacuum and pressure for different insulation gases. The vessel is made of transparent material to observe the test. The control box has a manual valve and a gauge for the settings.

MF - MEASURING SPARK GAP - 9781899

The measuring spark gap is used for obtaining breakdown voltages at various arcing distances and various electrodes arrangement. The measuring spark gap can also be used as chopping gap by mounting an electronic trigger sphere EZK. It can also be used as protection spark gap.

The arcing distance can be set through the control laptop.

KIT 4.0 SPECIFICATIONS [1]

Electrical Input		Electrical Output		Hardware	
Voltage	3 pH - 380 ... 415 V	Voltage	1 pH - max. 440 V	Dimension	1 x 0.8 x 1.1 m
Frequency	47 ... 63 Hz	Frequency	10 ... 200 Hz [2]	Weight	200 kg
App. Power	10 kVA	App. Power	10 kVA	Safety Level	SIL 3
Current	14.4 A	Current	22.7 A	Duty Cycle	Continuous

Configuration	Rated Voltage	Frequency	Base Load	Rated Current *without comp. reactor*	Rated Current *with comp. reactor*
1 Stage AC	100 kV	50 Hz	100 pF	100 mA	-
2 Stages AC	200 kV	50 Hz	50 pF	38 mA	100 mA
3 Stages AC	300 kV	50 Hz	33 pF	10 mA	80 mA

Configuration	Rated Voltage	Smoothing C	Rated Current
1 Stage DC	140 kV	25 nF	11 mA
2 Stages DC	280 kV	25 nF	11 mA
3 Stages DC	400 kV	25 nF	8 mA

Configuration	Max. DC Charging Voltage	Max. Charging Energy	Max. LI at No Load	Max. LI at Max. Load	Test Object Range LI
1 Stage IMP	140 kV	250 J	125 kV	98 kV	0 - 300 pF
2 Stages IMP	280 kV	490 J	243 kV	196 kV	0 - 170 pF
3 Stages IMP	400 kV	740 J	365 kV	295 kV	0 - 120 pF

[1] Note: All data are provisional, to be confirmed after order and depending on final scope of supply.
[2] 10 ... 50 Hz with voltage derating of the system

Global Presence

Europe
HAEFELY AG
Birsstrasse 300
4052 Basel
Switzerland

☎ + 41 61 373 4111
✉ sales@haefely.com

China
HAEFELY AG Representative Office
8-1-602, Fortune Street, No. 67
Chaoyang Road, Beijing 100025
China

☎ + 86 10 8578 8099
✉ sales@haefely.com.cn

HAEFELY

Current and voltage – our passion

HV HIGH VOLTAGE
IN INSTRUMENTS
EM EMC

precision. swiss made.