Step Voltage Test Controller

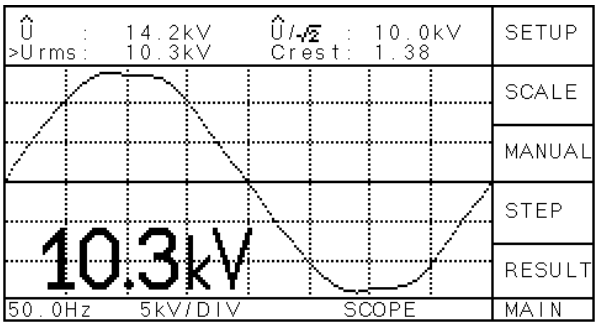
STEP*compact*

Increasing the high voltage stepwise is a task that is often required during type testing and production testing of high voltage equipment. The STEP*compact* is an instrument to automate such step tests. The unit combines the control function with the measurement capabilities of a high voltage meter.

To ensure a safe unattended processing of a step test, the STEP*compact* offers several safety features. Incipient breakdown is detected by monitoring the change of the voltage (dU/dt). Further, timeout limits can be set.,

Hardware Configuration

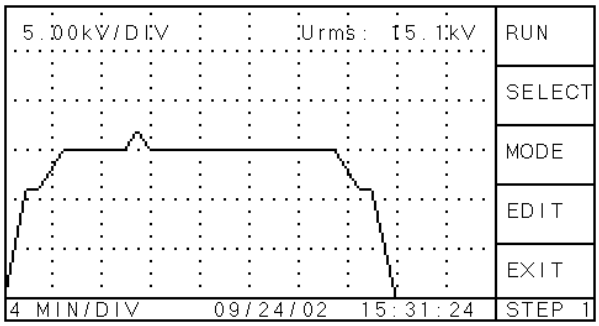
The STEP*compact* measures the voltage signal derived from a capacitive or resistive divider. A nominal input voltage of 100V_{RMS} is accepted. In order to correctly acquire even excessively distorted high voltage signals, the STEP*compact* samples up to 200V peak signals. The instrument calculates and displays the characteristics of the captured high voltage signal such as U_{DC}, $\hat{U}$, $\hat{U}/\sqrt{2}$, U_{RMS}, frequency, and the crest factor.



In the standard configuration, the STEP*compact* comes with a self-contained relay box that is remotely controlled via a fiber optic cable. Alternatively, a direct connection to the HV*control*, Power Diagnostix' standard control unit for high voltage test sets, can be provided. Using either the fiber optic transmission or the HV*control*, the UP and DOWN relay contacts of the voltage regulator are actuated to adjust the high voltage according to the programmed test sequence.

Software Configuration

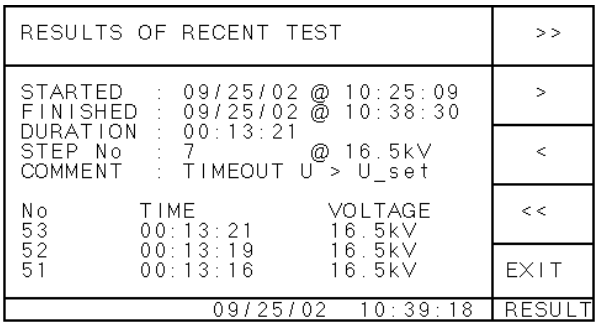
Using the five menu-driven control buttons, up to 35 different test sequences can be programmed and stored in a non-volatile memory. A test sequence consists of steps and ramps in any order. Beside the automatic mode, a manual mode can be used to set a specific voltage and keep it over time. In factory environments with strongly varying load situations, this function can be very helpful to maintain a stable high voltage level with long-term test.



Up to seven configurations can be stored in the non-volatile memory in order to adapt the instrument to the sets. Besides the divider ratio, a configuration setup contains settings such as the control cycle or the control window to tune the instrument to the properties of the high voltage test set. A timeout limit and a voltage difference can be set to detect a faulty high voltage supply or an incipient breakdown.

Data Recording

The instrument keeps a record of the recent test to validate its successful completion or to indicate the point of breakdown or cancellation. During the test up to 2000 sampled data of test duration and voltage level are stored. Start time and finish time are taken from a real-time clock and put into the results as well.

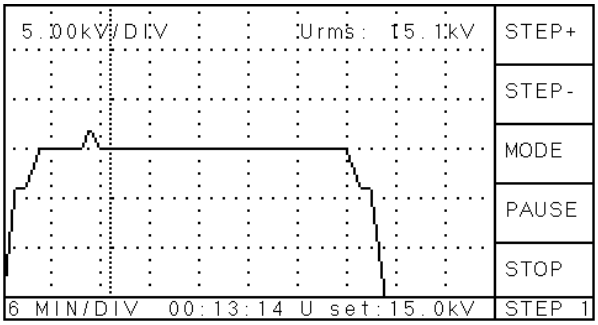


Further, the STEP*compact* is available with a recorder output. A second BNC connector carries a reconverted analog (DC) signal of 0–10 V, which corresponds to the displayed high voltage value. This signal can be fed to a paper recorder, for instance.

Display Menus

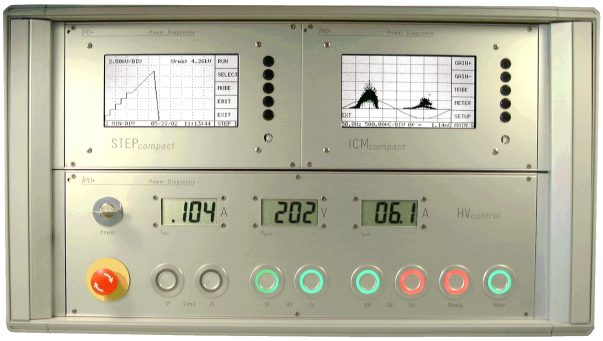
The input voltage is sampled in high resolution and one cycle is displayed as an oscilloscopic trace. Any distortion of the high voltage due to transformer core saturation or power frequency harmonics, for instance, are clearly identified with this display. The screen is automatically synchronized with the measured voltage and the amplitude deflection is controlled by an auto-range function.

During a test, the display can be altered between the voltage waveform and the test sequence. A cursor and the set time and voltage values show the proceeding test and help to observe the test procedure.



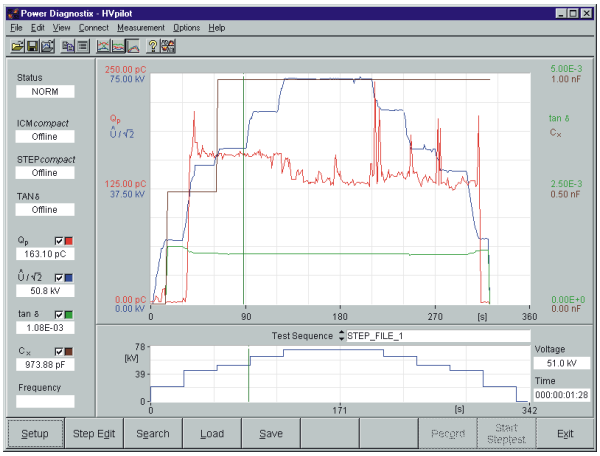
Modular Concept

Besides using the STEP*compact* as a standalone instrument together with the relay box, it can be combined with other test instruments of Power Diagnostix to build a fully automated acceptance test environment. The HV*control* is prepared to directly connect to the STEP*compact* and will give all standard functions required to manually operate a high voltage transformer.



HV*pilot* Software

The HV*pilot* software allows the complete supervision of a high voltage test sequence. Using a serial interface, the software connects to the STEP*compact* for the voltage control and measurement. Further, the HV*pilot* software offers convenient programming and editing of the test sequences. Additionally, this software can connect to the ICM*compact* to read the partial discharge level and to the TDA*compact* to read the tanδ as well as the capacitance of the device under test.



Technical Data

Instrument

Mains supply:	85-264 V_{AC} (automatic)
Frequency:	47–440 Hz (automatic)
Line fuse:	0.5 A (time-lag)
Power requirements:	Approx. 20 VA
Display:	Backlit LCD
Display resolution:	128 x 240 Pixel B/W
Dimensions W x H x D:	236 x 133 x 300 mm 9.3 x 5.3 x 12 inch (excl. BNC-connectors)
Weight:	Approx. 4 kg / 8.5 lbs
Recorder output:	0–10 V with R_0=100 Ω

Measurement Input

Synchronization:	20 Hz–300 Hz with U_{DC} selected, the supply frequency is used
Input impedance:	1 MΩ // 200 pF
Maximum level:	± 200 V_{peak}
A/D converter:	±11 bit
Precision:	<1.5 % (typical)
Samples:	197 samples per cycle
Values displayed:	U_{DC}, Û, Û/√2, U_{RMS}, crest factor, frequency
Adapted display:	The voltage curve is adjusted automatically to the range of 90 pixels of the display; the curve is plotted 1:1 if the level of the input voltage is below 2.5 V.

Relay Box

Mains Supply:	~230 V (others on request)
Frequency:	50–60 Hz
Line Fuse:	160 mA (slow acting)
Dimensions W x H x D:	200 x 60 x 80 mm 8 x 2.5 x 3.5 inch (excl. FO connector)
Relays:	1 A, ~250 V, NO (normally open) for: HV up, HV down, break off, error

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