

RIVmeter



RIVmeter - Radio Influence Voltage Meter

Instruments

The RIVmeter is an instrument for the measurement of radio influence voltage (RIV) according to the relevant standards (NEMA 107-1987, IEC CISPR 18-2:2010, EANSI 63-2-1996, VDE 876, DIN EN 55016-1-1). The instrument has a bandwidth of 9 kHz and a tunable center frequency of 100 kHz to 2 MHz. Technically, the RIVmeter is a selective μV -meter. However, the meter reading is weighted according to the CISPR weighting curve, whereas the repetition rate has a strong impact on the reading. The RIVmeter is an ideal instrument to replace outdated RIV measurement instruments in a transformer testing lab, for instance.

Some routine PD measurements are still done according to IEEE standards requiring the measurement of radio influence voltage. The RIV value is given in μV (interference voltage). A narrow band filter performs a quasi-integration of the PD pulses with a quasi-peak detection at the center frequency. This center frequency can be adjusted between 100 kHz and 2 MHz. The narrow-band pass filter allows to suppress external noise e. g. in non-shielded laboratories by varying the center frequency of the filter.

Two factors determine the RIV in μV : the transferred charge and the repetition rate of the PD impulse (number of PD pulses per second). Because of this proceeding, a direct translation of the

measured RIV values (μV) into values of apparent charge in pC is not possible.

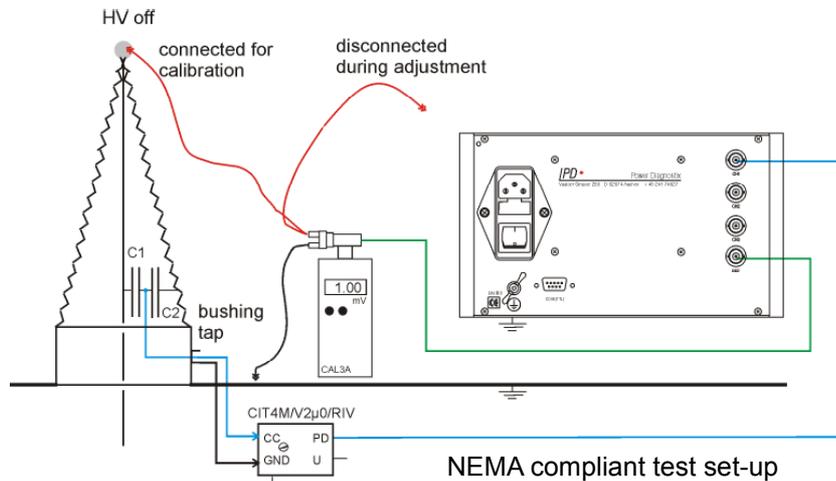
Historically, the RIV technique is based on measurement receivers to estimate the disturbance of communication lines.

New RIVmeter supporting old standards

Thus, properties of those instruments then available became part of the NEMA standards. However, both the 9 kHz bandwidth and the CISPR weighting curve put emphasis on some partial discharge activity, while they tend hiding others.

The calibration of the RIV measurement is done using an RIV calibrator, injecting a sine wave of typically 100 μV into the bushing. The multiplexer of the RIVmeter is used to conveniently determine the correction factor according to NEMA 107-1987 and other standards. Here, the unit compares the voltage injected, i. e., loaded by the bushing's impedance, with the voltage detected at the bushing tap to automatically determine the k-factor. This correction factor is then stored independently for each chan-

nel during calibration. The standard calibrator for RIV calibration, CAL3A, offers a selectable frequency range of 600-1350 kHz in steps of 50 kHz. The output voltage covers 10 μV to 10 mV in 1-2-5 steps. The CAL3B calibrator offers a frequency range of 400 kHz to 1.9 MHz with the same output voltage but in steps of 100 kHz. Having the same frequency range as the CAL3B, the CAL3D comes in contrast with a high impedance output ($> 20 \text{ k}\Omega$) according to IEC CISPR 18.2:2010.



NEMA compliant test set-up



Old Stoddart NM-25T



Old Siemens B83600-B40



CAL3A and CAL3D



RIVmeter rear panel

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