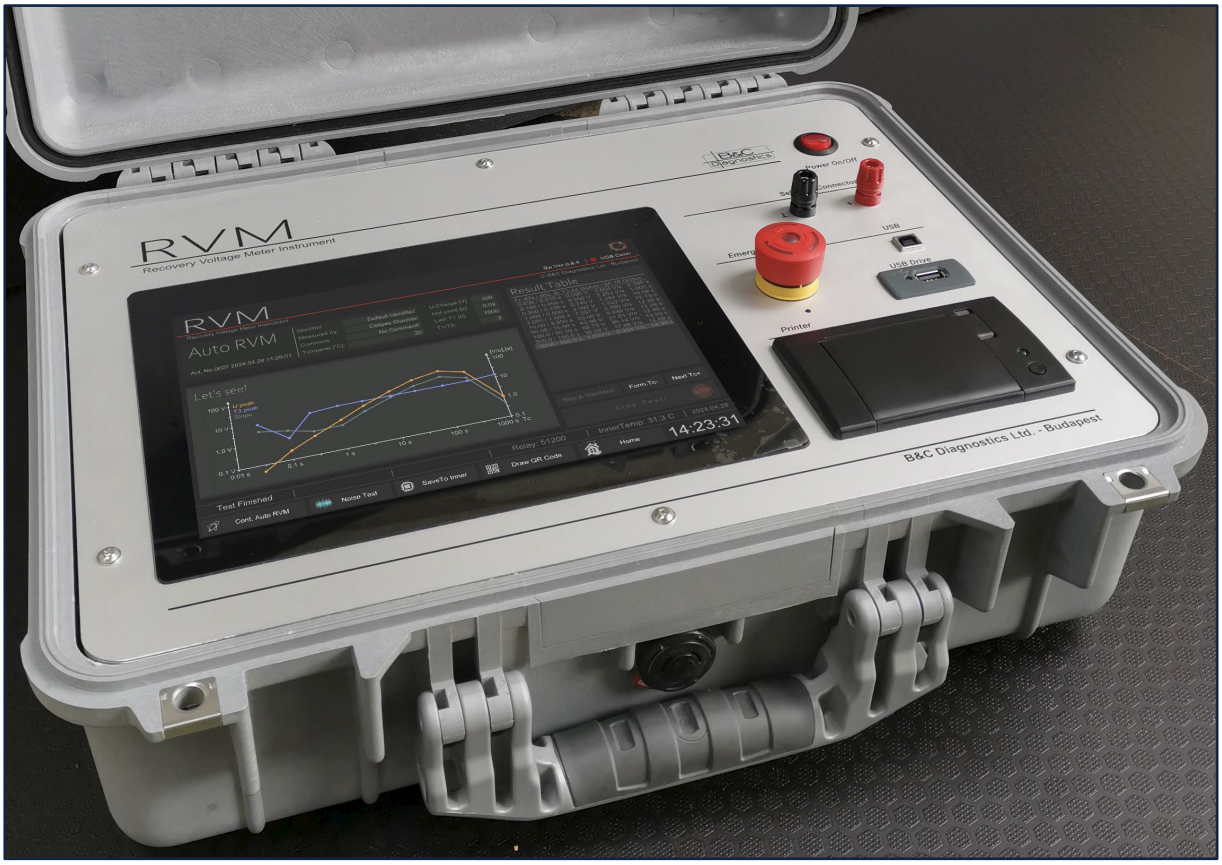
B&C Diagnostics

RVM 22

Recovery voltage meter



2025

DESCRIPTION OF THE INSTRUMENT:

This instrument was primarily developed for the examination of the general condition of oil-paper insulation systems.

It's a light, portable device with test voltage adjustable between 200 V and 2000 V.

By testing the polarization spectrum of an oil-paper insulation system, one can deduce the moisture content and aging state of the paper.

RVM 22 also has an insulation resistance measuring function.

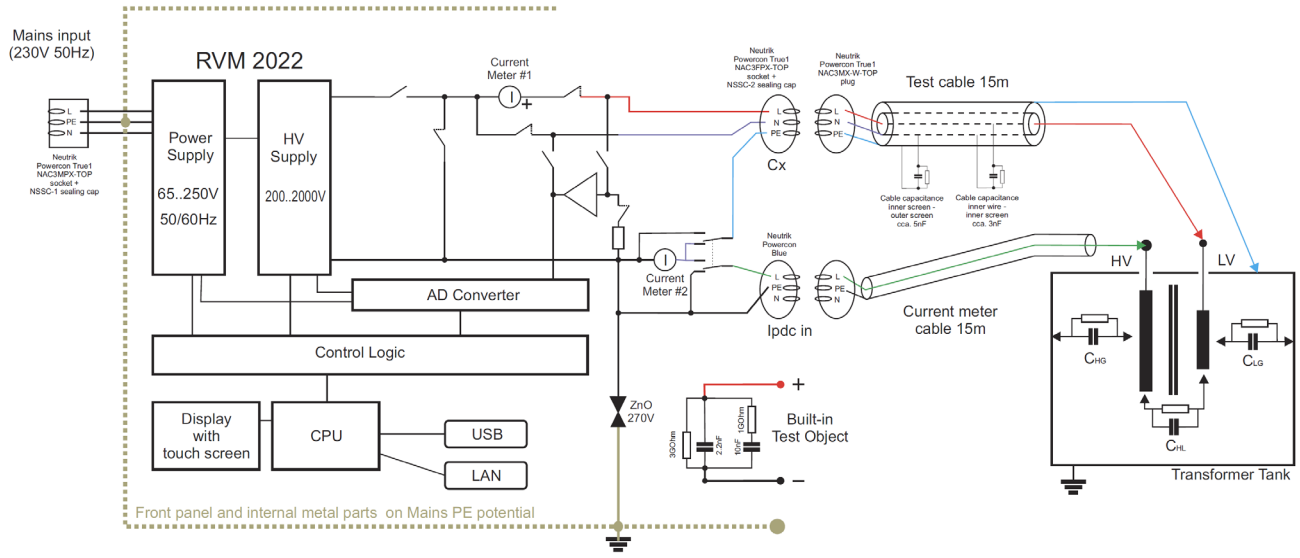
This device is the improved version of RVM 5461, 5462a and RVM PDC.

In addition to conducting polarization tests taken by the so-called recovery voltage measurement method, RVM 22 is able to register polarization and depolarization currents, record unique recovery voltage curves as well as to measure insulation resistance.

Due to the connectors with IP65 protection on the back of the device, RVM 22 can also be operated with its lid down, which might be useful during a longer unattended measurement.

The instrument is the product of B&C Diagnostics Ltd. It is made in Hungary, and its sole distributor is Diagnostics Ltd.

INSTUMENT'S BLOCK DIAGRAM:



SPECIFICATIONS:

Test voltage:	200 V ... 2000 V, adjustable in 10 V steps
Electrometer input:	+750 V…-100 V max.1 pA at 25°C
Current measurement:	2 mA…10 pA
Time constant range:	20 ms ..... 10000 s
Line power:	65-250 V 50-60 Hz max. 30 VA
Display:	10” graphic touch screen
Connection:	power and test lead connectors are located on the back of the case and have IP65 protection
Measuring cable:	15 m triax cable with large clamps and Neutrik powerCON® TRUE1® TOP connector Separate current measuring cable for PDC measurement with Neutrik XLR plug
Dimensions:	470 x 357 x 176 mm
Weight:	approx. 9kg
Other services:	built-in real time clock built-in test circuit (1 time constant RC component) for self-testing Flash memory to store test results built-in thermal printer (USB interface (B type connector) future option) USB Drive socket (A type socket) for results exporting
PC software:	RVMView reading and test report creator program (Win XP….Win11)

SCOPE OF DELIVERY:

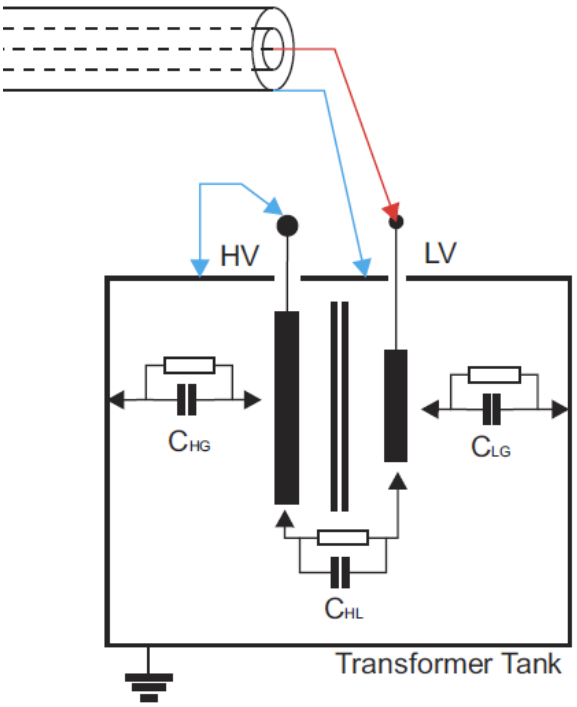
- RVM 22 instrument
- Euro plug mains connector cable
- 15m measuring cable with clamp ends
- 15m measuring cable for PDC measurement
- operating instructions
- test certificate
- software
- extra paper rolls for the printer (2 pieces)

DISTRIBUTOR:

Diagnostics Ltd.
1161 Budapest, Kossuth L.u.83.
Hungary
info@diagnostics.hu
www.diagnostics.hu

PREPARING A TEST – CONNECTING TO TEST OBJECT

Standard RVM Measurement



Connect the HV side L1-L2-L3-N bushings together with a pure copper or aluminum wire.

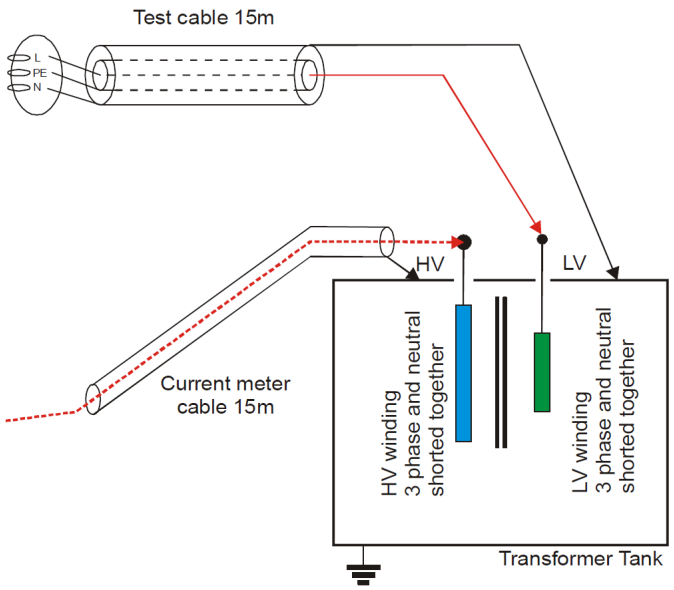
Do the same short-circuit connection on the other windings as well.

For standard RVM measurement you will need only the Cx cable, connected to the Cx output on the rear side.

Select the winding on which you want to do the measurement:

- In a stabilized state insulation any of the windings should give you the same result
- Choose the winding that has to most paper insulation on it.
- Usually LV winding gets less noise from the surrounding, but HV has more paper

RVM + PDC Measurement or PDC Curve recording

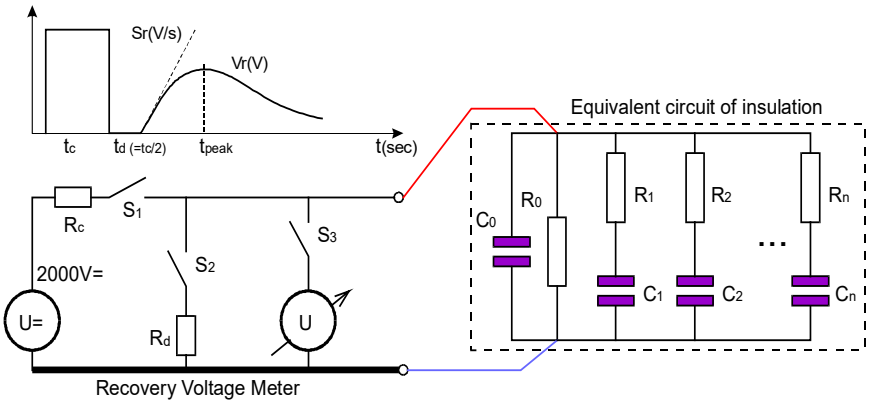


For an RVM + PDC test you will need the PDC cable connected to the other winding:

- Connect Cx Red Clip to the selected winding
- Connect Cx Black Clip to the transformer tank
- Connect PDC Cable to the other winding

RVM BASICS – HOW TO TEST INSULATION AND WHAT RESULTS YOU GET

This figure shows simplified RVM measurement and the voltage curve.

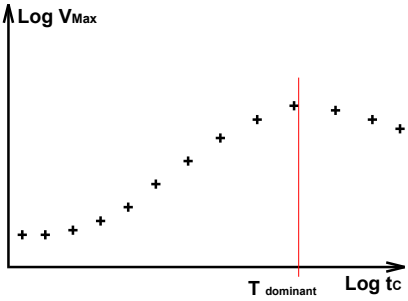


It charges the test object capacitance for Tc time, then discharges it for Td time (usually half of the Tc), than opens short circuit and connects an electrometer to the test cable end.

The charged (activated) and non discharged polarization inside the insulation starts to develop a potential, we call recovery voltage.

The instrument measures the initial slope and the peak value of the recovery voltage.

After several cycles with increasing charging times, we can scan the polarization spectrum behavior of the insulation.



Tc starts at 20ms or 30ms and steps up to 10000sec in an 1-2-5-10 or 1-3-10 sequence.

The results are displayed on a Log / Log diagram.

The most intensive polarization (we call dominant time constant) is in correlation with the moisture content of the paper, at the given insulation temperature.

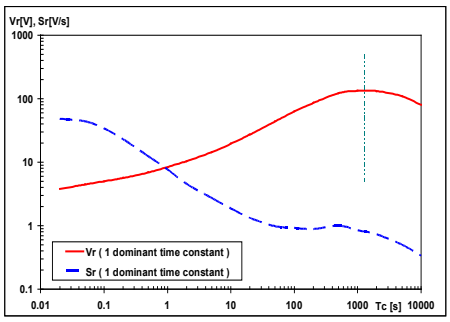
The more moisture is in the insulation the dominant time constant shifts toward the shorter time constant levels (Left).

With the increasing temperature the result curve also shifts to the left, so try to estimate the insulation temperature as accurately as possible.

We advise doing the measurement sequence up to minimum 1000sec charge time.

If there is enough time it is better to do the test up to 3000 or 10000sec to get a better picture especially about a dry insulation.

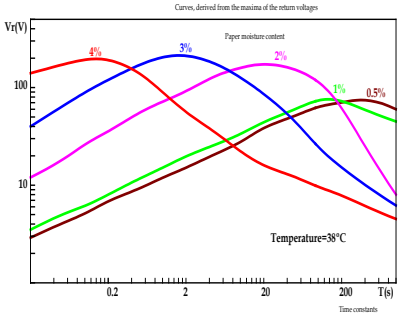
This is a typical result curve with the peak values (Red) and the initial slope values (Blue)



This figure shows one result of the original investigation.

You can see RVM curves of real oil-paper test objects with different moisture content.

The temperature was 38°C.



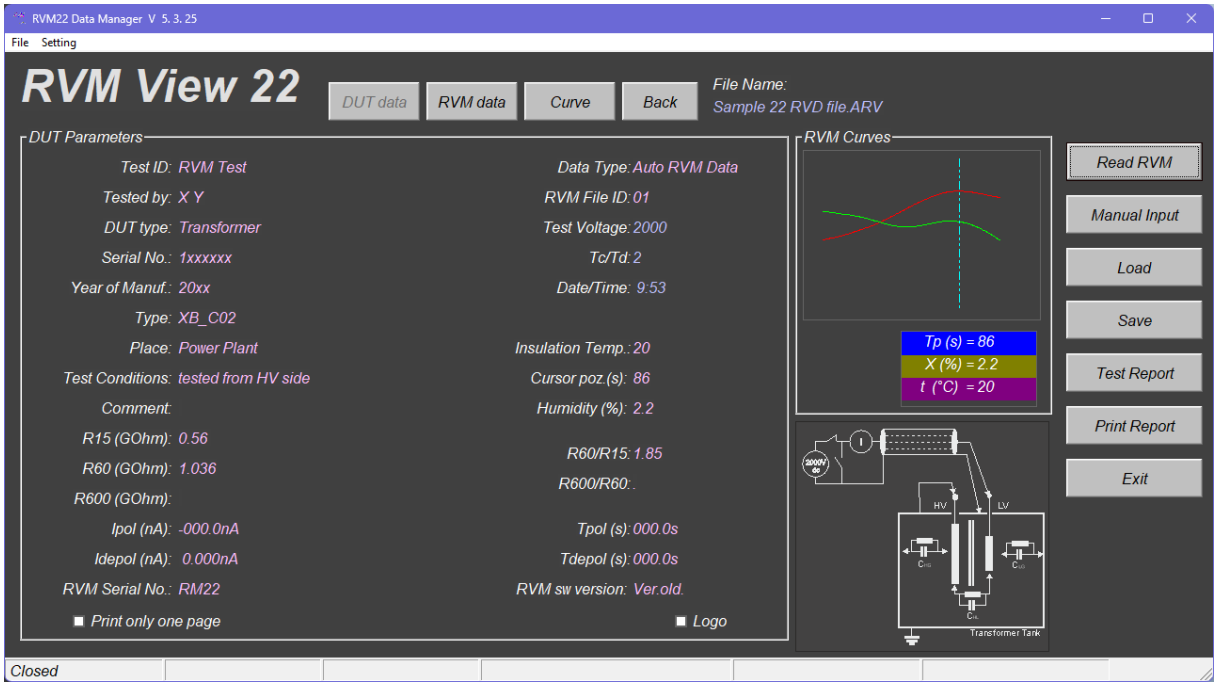
THE RVMVIEW22 EVALUATION SOFTWARE:

RVMView22 program is designed for data retrieval and evaluation of the measurement results of the new RVM22 measuring instrument.

It also supports data retrieval from the previous RVM instruments RVM5461, RVM5462 and RVM-PDC.

It can also read, and display data saved by the previous versions of RVMView (*.rvd).

Setting DUT parameters:



RVM Curve evaluation by moving the cursor to the maximum:

The result curve appears in this window.

Red curve is derived from the maximum recovery voltage values at the different Charge-Discharge-Measure procedures (Ur). The Green curve derived from the Initial Slope values (Sr).

You can see the calculated moisture content at the given temperature and cursor position. Move the cursor to the maximum point of the red curve and get the X% value in the table.

After saving the file the cursor position will be saved as well.

View and edit the results at the RVM Data window: