RoeTest – Computer Tube Tester / Tube measuring System

(c) - Helmut Weigl www.roehrentest.de

Protection against over currents and short circuits:

(Since PC software version 5.8.0.2)

1. Hardware current limiting

There is a built in current limiting for the each the heater-, anode- and G2-currents(see also the building instructions). At increased current the MPSA44 transistor reduces the voltage of the MOS-Fet and so the current is limited and the output voltage will drop. In some cases a lot of power must be dissipated by the MOS-Fet if this happens. Operation within the current limit must be kept as short as possible. Please switch off early enough to not damage the MOS-Fet.

2. Software over current recognition

When the output voltage drops at full load current (hardware current limiting is activated) the software will recognize this (with a little delay). The limit for software recognition is adjustable (Options). It shall be adjusted so that reliable shutdown is achieved but not switched off unwanted. (Keyword “cold resistance of the filament”). The software over current recognition is active for automatic modes and the manual mode and serves for device protection in case of a short circuit.

3. Current limiting dependent on tube data

Purpose:
Protection of the tube from over currents (only available in automatic modes, not active in manual mode).

The RoeTest automatically tries to determine meaningful parameters for the shutdown limit (which currents are surely too high for the tube – tube defective or operating error?).

Heater current: Limit is 2.5 times the nominal value; when using quick start an additional tolerance factor will be taken into account. If there is an exception (absolute value) defined in the tube data then this value applies.

Anode current: Limit is 3 times the nominal value. For diode tubes at low currents up to 10mA the limit is 6 times the nominal value. If there is an exception (absolute value) defined in the tube data then this value applies(Istop).

IG2: Limit is 3 times the nominal value.

Ik: Maximal current from limit; will only be considered when there is no nominal current in the tube data.

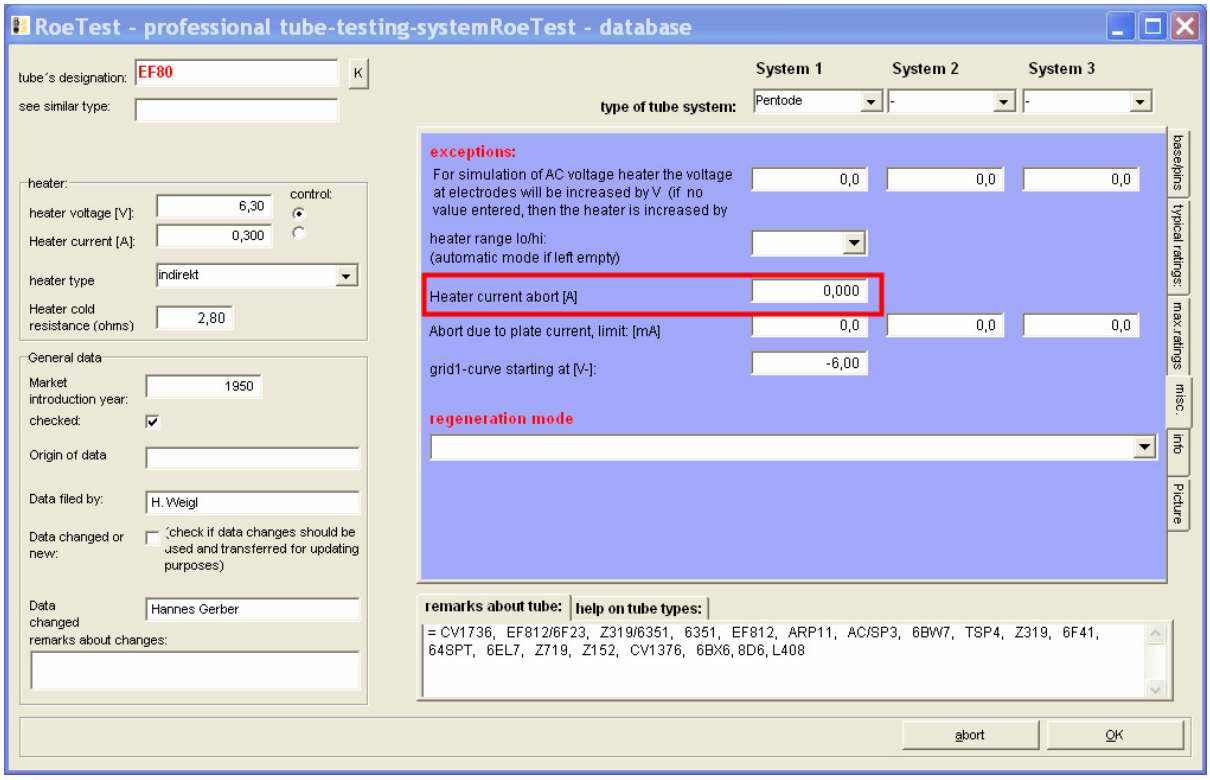
Problem:

Measurement stops abrupt. The message displayed is: heater current too high, anode current too high, G2-current too high or cathode current too high.

Solution:

The automatic software over current recognition has been activated. The software compares the values from the database with the measured values. When exceeding the limit x times measurement is stopped for safety reasons. There may be several causes for that:

1. A short circuit in the tube → perform short circuit test (wait a few minutes until the tube is really cold)
2. Tube type and loaded data do not correspond → load the correct data
3. The data from the database are incorrect (e.g. wrong socket assignment stored, wrong values for voltages or currents) → read tube data sheet and correct the values
4. Loss of tube vacuum → the heater current is often higher in this case
5. The switch on current for the cold tube is too large, the current limiting is activated->it is possible to manually define a stop limit in the database (data for the specific tube type)



6. There are larger variations of tubes. Good tubes often show more than 100% of the nominal value. Eventually the protection circuit of the RoeTest is triggered by a too high current. In this case define a reasonable value for the tube system at “Abort due to plate current, limit: [mA]...”.

Note: The same fields also allow to limit the maximum current for recording characteristic curves to avoid torturing the tube to death. When the absolute value is reached recording of the characteristic curve is stopped respectively the next recording of a characteristic curve is started.