

IPAS

Tester of II tubes at production/repairing level



Fig. 1. Photo of the IPAS test station

BASIC INFORMATION:

Modern, ready to use, potted image intensifier tubes are built by combining two modules: bare image intensifier tube and an electronic circuit called power supply. The latter module controls electrical parameters (voltage, current) at different parts of bare tube: photocathode, input of MCP, output of MCP, screen) depending on input light conditions. In order to assure optimal tube performance under input light varying from very dark night to day conditions, the power supplies of modern image intensifier tubes must include several advanced electronic circuits (automatic brightness control, bright spot protection, auto-gating, etc). Poor quality power supplies can generate unwanted effects like flickering, or poor protection against strong light flashes even when cooperating with perfect bare tubes. Next, bare tubes generate best image only when the tube is powered at optimal set of voltages between different electrodes (photocathode, MCP input, MCP output,

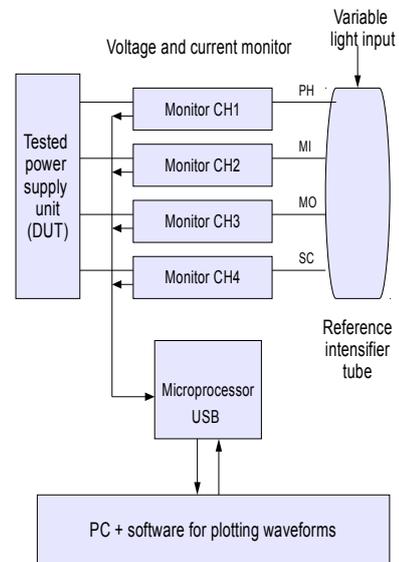


Fig.2. Block diagram of VCM monitor

screen). This optimal set of voltages varies from tube to tube.

To summarize, production/repairing high performance II tube requires optimisation of voltages between different electrodes of II tubes and integration of bare tube module with high performance HV power supply module. At the same time power supplies are often characterized by lower reliability than most bare tubes. This situation makes proper testing of power supplies critical in both manufacturing new potted tubes and in repairing old tubes.

IPAS station is an universal test station that enables testing and optimisation of HV power supplies used to built modern image intensifier tubes.

The test station generates regulated light stimulus at photocathode of the tested tube, and enables measurement of electrical parameters (at all bare tube connectors) and luminance (at tube screen). Reactions of tested power supply to incoming light pulses can be measured, analysed and optimal setting of the power supply can be found.

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HOW IT WORKS

IPAS test station works as:

1. Image projector capable to project on photocathode images of two standard targets (1-uniform, 2-spot) (option: additional resolution target) at regulated light intensity.
2. Computerized system capable to measure voltage/current at all bare tube connectors and to measure output luminance at tube screen
3. Calculation system capable to determine temporal profiles of luminance gain or output luminance.

HOW IT BUILT

IPAS station is built from the following modules: IPAS base module, set of HV cables, set of LV cables, PS1 power supply, set of adapters for potted tubes, set of adapters for bare tubes, LP4 luminance probe, (option: additional MI2 microscope), IPAS Control program, VCM monitor, VCM Control computer program, PC set. VCM monitor is crucial module. The latter module is a computerized, multi input/output device optimized for measuring high voltages and currents at bare tube electrical connectors. Other modules are similar to typical modules used in ITS stations.

TEST RANGE

- Measurement of voltages, currents at electrical connectors of bare image intensifier tubes at static light levels
- Measurement of temporal reactions of voltages, currents at electrical connectors of bare image intensifier tubes to incoming pulses of light (input illuminance)
- Measurement of luminance gain, saturation level, and photocathode luminous sensitivity

VERSIONS:

IPAS-A – static tests (tests at static light intensity levels), IPAS-B – both static and dynamic (temporal variable light intensity profiles) tests, IPAS-C – additional tests of resolution of II tubes using classical microscope.

SPECIFICATIONS

Input light source

Light Source

Dual: 1)polychromatic 2850K color temperature halogen source
2)monochromatic LED light source

Illumination level

Regulated from at least 0.02 mlx to at least 200 lx

Regulation type

Digital from PC

Modes of work

1) Flood mode (uniform illuminations), 2)Spot mode (intense bright spot)

Output light meter

Type

calibrated silicon photodiode of photopic spectral response

Measurement range

0.05 cd/m² – 5000 cd/m²

VCM Monitor

LV Power supply voltage/ current

2,65 – 2,75V/ ≤ 100mA

Time constant (VC Monitors all channels)

1s

Noise level (VC Monitors all channels)

≤ 0,50%

Accuracy (VC Monitors all channels)

≤ 0,80%

Temperature coefficient

typ. 0,05% /°C

Voltage overload capability (VC Monitors all channels)

10kV

Number of VC Monitor channels

4

Channel 1 voltage/current

0 – 1000V/ 0 - 1000nA

Channel 2 voltage/current

0 – 2500V/0 - 10μA

Channel 3 voltage/current

0 – 3000V/0 - 20μA

Channel 4 voltage/current

0 – 8000V/0 - 10μA

Short circuit/reverse polarity protection

yes

PC interface

USB

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Data sheet version 3.2 dated 22.04.2014

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