

TV Measurement Equipment FMS 100

The combination of TV measurement
demodulator and a digital analyser
for Video and Audio



TV Measurement Equipment FMS 100

FMS 100 sets new standards in the field of measurement and quality assessment of telecast and transmission systems.

The combination of TV measurement demodulator and a digital analyser unit makes the FMS 100 a model for future technology and predestines it to carry out extensive measurements of linear and non-linear transmission characteristics in time and frequency domain.

Due to its wide spectrum of application, FMS 100 is used in laboratories, service sector, automatic measurement and supervision systems as well as production and quality control.



The FMS 100 along with VFIRF measurement signal generator VRM 100.

The measurement receiver of the FMS 100 has projecting demodulation characteristics in the frequency domain of 44 ... 860 MHz (without gap) and is available for a variety of TV standards like B, G, D, K, I, and NICAM etc.

The important transmission characteristics, e. g. input level of the vision and sound carrier, FM deviation, zero keying and bit error rate of the video text are measured and displayed on an LC-display.

The RF-receiver unit characterises itself through its high selectivity, saturation stability, and a wide dynamic range of 32 μ V to 2,2 V.

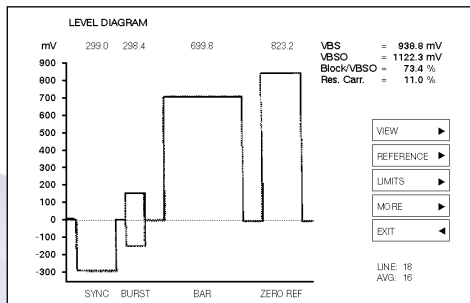
The precision measuring demodulator with Q-output has a low level of tolerance in frequency and group delay time response and surpasses many specifications. Sound traps and pre-emphasis can be switched off.

The digital video and audio analyser makes it possible to evaluate a number of test lines and to carry out AF-measurements with graphic representation on a high-resolution 10" colour screen.

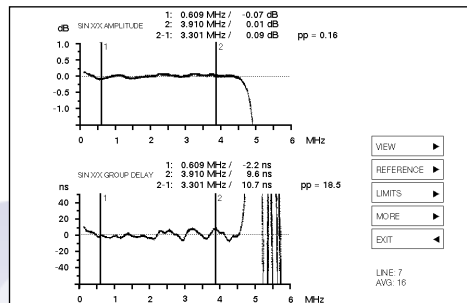
The measurement receiver and the analyser work independently of each other; for e. g. the receiving component of FMS 100 can work as a direct-pick-up-receiver while the analyser carries out any measurements for a previously fed-in VF/AF signal.

Furthermore, the software of the analyser offers easy functions which simplify the application of the routine measurement practice or the supervision of the signal quality significantly. This includes reference productions for relative measurements, tolerance masks, extensive cursor functions and a "default" function for a basic adjustment. An average value can be evaluated for all measurements.

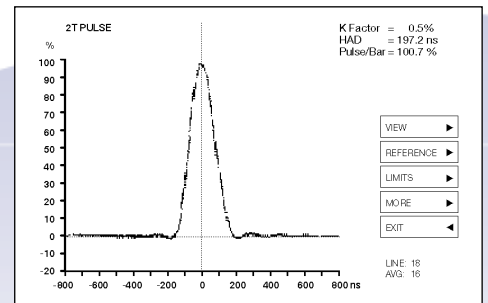
Examples of measurements with the analyser:



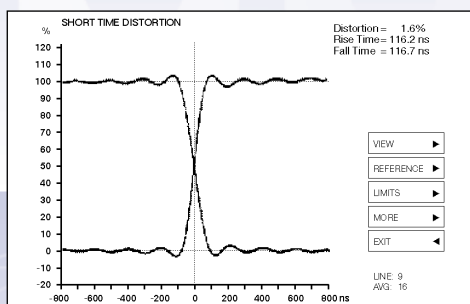
Measurement of all important VF-levels like H-synchronic pulse, auxiliary colour carrier, white level pulse, clamping pulse, BAS, BASO, black-level/BASO and residual carrier.



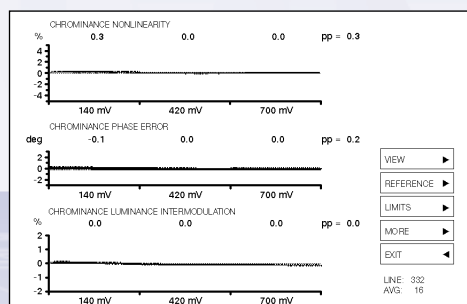
Measurement of amplitude and group delay in the VF field 0 ... 8 MHz with the help of sin x/lx pulse.



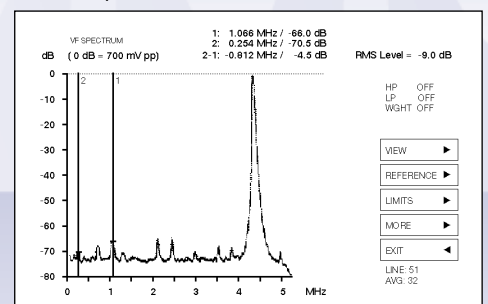
Graphic, normed representation of the 2T-pulse and numerical indication of the K-factor, half intensity width and 2T-pulse white pulse-amplitude relationship.



Graphic representation of rising and falling flanks of 250 KHz rectangular pulse and numerical display of the rise/fall duration and Short Time Distortion.



Chrominance non-linearity, chrominance-phase-error and chrominance/luminance-intermodulation measured with the help of the level chrominance carrier of the line CCIR331.

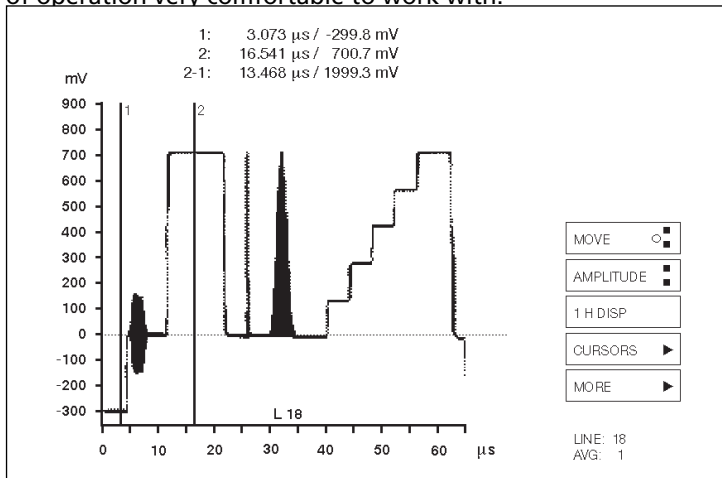


Representation of the VF-spectrum of the chosen line.

The results of the measuring routines differential gain, differential phase, ICPM and luminance non-linearity can be displayed simultaneously which is a big help especially for transmission equalisation.

The analyser can unite many measurements in an automatic measurement process for a cyclic supervision of transmission systems.

The Waveform representation enables the oscillographic reading of test-lines. Various characteristics like selectable scaling, cursor functions and the simple switching over to the corresponding line of the other frame make the Waveform mode of operation very comfortable to work with.



Waveform-representation of the line CCIR 18

The RF-Spectrum representation allows measurements in the RF spectral field with the dynamics of 70 dB and permits the evaluation of spuri and intermodulation products.

The video text option of the FMS 100 enables the evaluation of the corresponding data lines in the input signal as well as in VF, intermediate frequency, or RF field.

The chosen video text page is displayed on the monitor. In addition to this, the bit error rate is measured and indicated during the whole transmission of the video text information. A graphic evaluation is possible with the help of an eye pattern diagram.

With a few additional gadgets, the FMS 100 can be transformed into a monitoring system for the purpose of measurement and supervision in TV-monitoring and transmission systems with a flexibility and quality of measurements that has never been achieved before.

Besides continuous, automatic quality control, the Monitoring System can also be used for high value measurements and equalisations at the site.

All measurement results can be filed, statistically evaluated, clearly represented by a computer and then printed by a protocol printer. For example, a master computer can dial the Monitoring System over an integrated Modem.

Furthermore, the computer can check all measurements for values exceeding the limiting value (inner and outer range of tolerance) which can be defined as required.

In this way, alerts can be produced in case of values exceeding the limiting value and can be displayed either on the monitor or protocol printer or transmitted via interfaces.



The FMS 100 in the Monitoring System MON 100 of the company Plisch

Besides the traditional reserve concepts like active and passive reserve, the n+1 reserve concept represents a new alternative for the conception of redundant transposer and transmitter systems in transistor or tube technology.

The n+1 reserve is a flexible and universal reserve concept since in many cases, for example in passive reserve, a 100% redundancy is economically not very feasible due to the high degree of dependability of modern transmission systems.

Transposer stations can also use FMS 100 in n+1 reserve systems instead of a standard demodulator like the TVU 800 of the company Plisch in order to have the various measuring functions of FMS 100 additionally along with the possibility of relay at the intermediate frequency level.

TV Measurement Equipment FMS 100

Technical Data

Inputs

RF inputs	
Frequency range	44 ... 860 MHz (without gap)
Input level (selective input)	30 dB μ V ... 127 dB μ V (32 μ V ... 2,2 V)
Input level (broadband input)	100 dB μ V ... 127 dBmV (100 μ V ... 2,2 V)
Impedance	50 Ω
Image frequency rejection	≥ 100 dB
IF input	
Frequency range	33 ... 40 MHz
Input level	70 mV ... 350 mV
Impedance	50 Ω
Video input	
Frequency range	10 Hz ... 8,0 MHz
Nominal level	1 V _{pp}
Impedance	75 Ω
Q input	
Frequency range	10 Hz ... 300 kHz
Nominal level	1 V _{pp}
Impedance	75 Ω
Zero keying input	
Input level	TTL
Audio inputs	
Frequency range	20 Hz ... 20 kHz
Nominal level	6 dBu
Impedance	2 x 10 k Ω sym.

Outputs

IF Output	
Frequency range	33 ... 40 MHz
Output level	-7 dBm or -4 dBm \pm 0,5 dB
Video outputs	
Output level	1 V _{pp} \pm 1 %
Impedance	75 Ω
Q output	
Output level	1 V _{pp} \pm 1 %
Impedance	75 Ω
Audio outputs	
Output level	
(selective and sym. outputs)	6 dBu or 9 dBu \pm 0,2 dB
Output level (broadband outputs)	6 dBu \pm 0,2 dB
Impedance	$\leq 30 \Omega$
Deemphasis (disconnectable)	50 μ s \pm 2 %
Pilot output	
Output level	-15,6 dBu \pm 0,5 dB
Impedance	$\leq 80 \Omega$

Non-linear distortions

Luminance	$\geq 0,99$
Chrominance	$\leq \pm 0,7 \%$
Differential phase	$\leq \pm 0,7^\circ$
Signal-to-intermodulation ratio (equivalent to static meas. - 6/ - 10/ - 14 dB)	≥ 55 dB ref. to VB

Video signal-to-noise ratio (broadband)

weighted noise	≥ 67 dB
unweighted noise	≥ 60 dB

Periodic interference (selective and broadband)

Hum level	≥ 55 dB
Other periodic interference	≥ 60 dB

Audio Demodulator

Amplitude response	
20 Hz ... 15 kHz	$\leq \pm 0,3$ dB
15 kHz ... 60 kHz	$\leq + 0/- 6$ dB

Non-linear distortions	
For 50 kHz Deviation	$\leq 0,35 \%$
For 70 kHz Deviation	$\leq 0,7 \%$

Signal-to-noise-voltage ratios according to DIN 45 405 and CCIR 468-2	
Direct sound demodulation	≥ 66 dB
Intercarrier demodulation	≥ 50 dB (typical ≥ 56 dB)

Crosstalk	
Dual sound operation	≥ 80 dB
Stereo	≥ 40 dB

Measurement functions

Level display (vision carrier, sound carrier 1 + 2)	
Accuracy	$\leq \pm 1$ dB

Deviation display	
Display accuracy sound 1/2	± 500 Hz
Display accuracy pilot	± 100 Hz

Videotext error display	
Display accuracy	± 100 ppm

Zero keying	
Zero keying time	5 μ s
Zero keying position, line period	13/64 H ... 58/64 H in lines 7 ... 309 and 320 ... 621
Zero keying position, field period	lines 7/320 ... 22/335 at 36/64 H

General data

Operational temperature range	+ 10 ... + 45 $^\circ$ C
Supply voltage	230 V $\pm 15 \%$, 40 ... 63 Hz
Power consumption	max. 200 VA
Dimensions w x h x d	19" x 5 HE x 444 mm
Weight	approx. 23 kg
Version	19"-drawer or table top model

Detailed technical data and data of the VF/AF-Analyser on request.

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Plisch Nachrichtentechnik

P.O. Box 17 80 · D-68507 Viernheim
Großer Stellweg 13 · D-68519 Viernheim
Phone +49 62 04 70 70 · Fax +49 62 04 70 72 00
<http://www.plisch.com>

