



FEATURES

- Comprehensive parametric testing in the frequency range 20 Hz to 20 kHz
- Spectrum analyzer and out of band noise measurement up to 85 kHz
- Measurements from ITU-T M.1020, M.1025, M.1030, M.1040, M.1050 and M.1060
- Analogue-to-analogue measurements on PCM systems
- Quasi analogue graph shows the measured results graphically
- Simultaneous phase hit, gain hit, impulse noise, and interruption event counting
- Interruption measurement with histogram display of results
- Group delay distortion measurement
- A range of accessories for signal balance, return loss, impedance and other measurements
- Integral loudspeaker and microphone
- Service telephone facility
- Loop holding and dialing (pulse and DTMF) for dial-up circuit testing
- Acoustic pair detection facility
- AC-DC Voltage measurement
- Memory for phone numbers
- In-service talk/listen and voice monitoring
- Automatic Master-Slave test sequences with preprogrammed templates and parameter sets
- Immediate PASS/FAIL indication
- USB interface for test results transfer to PC and SW upgrade
- PC program is provided to produce detailed test protocols in Excel format
- Large store-recall memory for test results
- 320 x 240 dot color graphic LCD display
- Internal rechargeable battery with an operating time of approx. 8 hours
- Processor controlled battery manager with three hour fast charging facility
- Selectable English, German or Russian languages
- On line help facility
- Handheld, lightweight (approx 0.8 kg)

APPLICATIONS

ELA 10 DATA LINE ANALYSER is a flexible and highly functional hand held instrument for analog testing in the range 20 Hz to 20 (85) kHz. Digital signal processing (DSP) technology delivers fast accurate results in a compact battery powered instrument ideal for field use. It is intended for the test of 2/4 W ordinary or special quality leased circuits and dial-up circuits.

ELA 10 provides single sided and end-to-end measurements with two instruments in MASTER-SLAVE arrangement. Just one person, thanks to the communication between the two instruments, can perform such measurements. Operation is made extremely simple by means of pre-defined automatic test sequences.

ELA 10 can be programmed as MASTER and SLAVE as well. Tolerance masks of cable parameters and the principal system parameters are pre-programmed for ITU-T M.1020, M.1025 and M.1040 systems.

When the automatic test sequence is ready ELA 10 provides an immediate PASS/FAIL indication by comparing the test results with the tolerance masks.

Detailed test results are available in graphic and numeric forms. In case of FAIL indication the reason of failure is marked with asterisks.

The test results can be stored in memory and transferred to PC for post processing or creating archive.

Measurements

Standard Manual Measurement Set

- Receiving
- Spectrum analyzer
- Transmitting
- Insertion loss (NEXT)
- Wide band noise
- Psophometric noise (O.41)
- Noise with tone (O.132)
- Longitudinal balance (LCL)
- Impedance
- Return loss
- Echo test
- AC-DC voltage

Measuring SW. Options

- Long time interruption analysis (O62)
- Event counters, simultaneously counting:
 - Amplitude hits (O.95)
 - Phase hits (O.95)
 - Interruptions (O61)
 - Impulsive noises (O.71)
- Group delay distortion (O.81 app. I)
- Phase jitter (O.91)

Standard Automatic end- to-end Measurements

- Loss
- Frequency response
- Background noise
- Noise spectrum
- Total distortion
- Near end cross-talk (NEXT)
- Impedance
- Return loss
- Longitudinal balance (LCL)

With Measuring SW Options

- Simultaneous event counting
- Group delay distortion
- Phase jitter

Preprogrammed Templates and Test Sequences

Passive circuits:

- ITU-T M.1020 2 wire
- ITU-T M.1025 2 wire
- ITU-T M.1040 2 wire
- ITU-T M.1020 4 wire
- ITU-T M.1025 4 wire
- ITU-T M.1040 4 wire

Active circuits:

- ITU-T M.1020 2 wire
- ITU-T M.1025 2 wire
- ITU-T M.1040 2 wire
- ITU-T M.1020 4 wire
- ITU-T M.1025 4 wire
- ITU-T M.1040 4 wire

SPECIFICATIONS

Selective Receiver

Impedances 600, 900 Ohm, >20 kOhm
 Frequency range 20 Hz to 20 kHz
 Level range +10 to -80 dBm
 Resolution 0.1 dB
 Accuracy (1020 Hz, 0 dBm, 600 Ohm) ± 0.1 dB

Frequency response
 200 Hz to 20 kHz ± 0.1 dB
 100 Hz to 200 Hz +0.1 -0.5 dB
 20 Hz to 100 Hz +0 -1 dB

Fix frequency mode
 Frequency range 20 Hz to 20 kHz
 Frequency step/bandwidth
 20 Hz to 360 Hz 1/1 Hz
 360 Hz to 3.6 kHz 5/1 Hz
 3.6 kHz to 20 kHz 25/50 Hz

Receiving 36 frequencies at the same time
 Frequency range 200 Hz to 3.6 kHz
 Frequency raster 100 Hz
 Bandwidth 10 Hz

Transmitter

Impedances 600, 900 Ohm
 Frequency range 20 Hz to 20 kHz
 Level range
 Without current loop +10 to -30 dBm
 With current loop +1 to -30 dBm
 Resolution 0.1 dB
 Accuracy (1020 Hz, 0 dBm, 600 Ω) ± 0.1 dB

Frequency response
 200 Hz to 20 kHz ± 0.1 dB
 100 Hz to 200 Hz +0.1 -0.5 dB
 20 Hz to 100 Hz +0 -1 dB

Fix frequency mode
 Frequency range 20 Hz to 20 kHz
 Frequency step
 20 Hz to 360 Hz 1 Hz
 360 Hz to 3.6 kHz 5 Hz
 3.6 kHz to 20 kHz 25 Hz

Transmitting 36 frequencies at the same time
 Frequency range 200 Hz to 3600 Hz
 Frequency raster 100 Hz
 Output Level -20 dBm/tone (3dBm peak)

NEXT (Loss)

Impedances 600, 900 Ohm
 Frequency range 200 Hz to 20 kHz
 Resolution 200 Hz to 3.6 kHz 5 Hz
 Resolution 3.6 kHz to 20 kHz 25 Hz
 Measuring range -10 to 70 dB
 Accuracy (1000 Hz, 600 Ohm)
 -10 to 60 dB +0.5 dB
 60 to 80 dB ±1 dB

Spectrum Analyzer

Impedances 600, 900 Ohm, >20 k Ohm
 Frequency range 20 Hz to 85 kHz
 Level range 0 to -90 dBm
 Resolution & bandwidth
 20 Hz to 360 Hz 2 Hz
 0.2 kHz to 3.6 kHz 20 Hz
 0.5 kHz to 85 kHz 500 Hz

Background Noise

Impedances 600, 900 Ohm, >20 k Ohm
 Frequency range 20 Hz to 85 kHz
 Measuring range 0 to -80 dBm
 Weighting filters Psophometric (O.41)
 1020 Hz Notch (O.132)
 3.1 kHz flat
 50 Hz to 250 Hz
 4.6 kHz to 85kHz
 Conditioning tone 1020 Hz
 Measurement times 1, 5, 10, 15, 30 s
 1, 5, 10, 15, 30 min

LCL Balance Measurement

Impedances 600, 900 Ohm
 Frequency range 200 Hz to 20 kHz
 Measuring range 0 to 40 dB
 Accuracy
 1kHz to 10 kHz ±1 dB
 200 Hz to 20 kHz ±2.5 dB

Impedance Measurement

Frequency range 200 Hz to 20 kHz
 Measuring range 300 to 1600 Ohm
 Accuracy
 1 kHz to 10 kHz ±5% ±5 Ohm
 200 Hz to 20 kHz ±10% ±5 Ohm

Return Loss Measurement

Frequency range 200 Hz to 20 kHz
 Impedances (Z) 600, 900 Ohm
 Measuring range
 Return loss measurement up to 40 dB
 Impedance range Z/2 to 2Z
 Accuracy at 20 dB
 1kHz to 10 kHz ±1 dB
 200 Hz to 20 kHz ±2.5 dB

DC voltage

Measuring range up to 300 V
 Resolution 0.1 V
 Accuracy ± 1% ±1 V

AC Voltage

Measuring range up to 200 V_{rms}
 Frequency range up to 200 Hz
 Resolution 0.1 V
 Accuracy ± 2% ±1 V

Optional Measurements

Interruption Analysis (O.62) SW. Option

Test signal 1020 Hz +10 to -30 dBm
 Threshold 3, 6, 10, 20 dB
 Evaluation time categories 0,6 to 3 ms
 3 to 30 ms
 30 to 300 ms
 300 ms to 1 min
 > 1 min
 Evaluation Relative duration
 Errored seconds
 Count/category
 Time distribution/category
 Measurement times 5, 15, 30, 60 min
 2, 4, 8, 12, 24, 48, 72 hour

Group Delay Distortion (O.81 app. I) SW. Option

Test signal 36MTT, 200 to 3700 Hz
 Resolution 100 Hz
 Output level -20 dBm/tone (3dBm peak)
 Input level range -50 to -10 dB/tone
 Group delay distortion range 0 to 5 ms
 Resolution 1 µs

Phase Jitter measurement (O.91) SW. Option

Test signal 1020 Hz, 0 to -30 dBm
 Range 0.2 to 30.0 degrees p-p
 Filter 4 to 300 Hz

Simultaneous Event Counting SW. Option

Measurement times 5, 15, 30, 60 min
 Test signal 1020 Hz, 0 to -30 dBm
 Maximum counts for each counter 65000

Amplitude Hit Counter (O.95)

Threshold range 2 to 9 dB
 Guard interval 4 ms
 Dead time 125 ±25 ms
 Dead time after interruption (>10 dB drop) 1 s

Phase Hit Counter (O.95)

Threshold range 5 to 45 °
 Guard interval 4 ms
 Dead time 125± 25 ms

Interruption Counter (O.61)

Threshold 6, 10 dB
 Guard interval 2 ms
 Dead time 3 ±1 ms

Impulsive Noise Counter (O.71)

Filter 1020 Hz Notch
 Guard interval 20 µs
 Dead time 125 ±25 ms
 Threshold range 0 to -50 dBm

Dialing and Loop Holding

Measurements can be made over a public switched telephone network by using the integral dialing and loop holding features of the ELA 10. Dialing is done from the numeric keys and loop holding is indicated on the screen.

Types of dialingDTMF, Pulse
 Loop holding current 9 to 90 mA

Memory Locations

For setups20
 For test results.....30
 For phone numbers 10

General Specification

Power supply

Internal rechargeable NIMH battery pack
 Operation timeapprox. 8 hours

Automatic power down

Selectable5, 15, 30 min
 after the last keystroke

Charging

(Without taking the battery pack out)
 From 230V mains with mains adapter
 From 12V car battery with car adapter
 Fast charging time less than 3 hours

Connectors

Serial interface USB 1.1
 Line connectors.....2 pieces of RJ 11

Display 320 x 240 dot TFT LCD

Over voltage protection

For high impedance input 250 V DC
 For terminated input/output..... 100 V DC

Ambient temperature range

Reference23±5°C
 Rel. humidity 45% to 75%
 Normal operation0 to +40°C
 Rel. humidity 30% to 75% *($<25\text{g/m}^3$)
 Limits of operation..... -5 to +45°C
 Rel. humidity 5% to 95% *($<29\text{g/m}^3$)
 Storage and transport-40 to +70°C
 Rel. humidity 5% to 95% *($<29\text{g/m}^3$)

Dimensions200 x 100 x 44 mm
 Weight (including battery pack)approx. 0.8 kg

Ordering information

DATA LINE ANALYSER ELA10..... 404-000-000
 Including:
 Operating manual
 Short form operation instructions
 Calibration Certificate
 CD (xxx version)
 Ground cable (banana to banana)
 2 balanced measuring cables
 USB cable for PC connection
 Mains adapter EU or UK or US version
 Battery (built-in)
 Carrying case

Options

PC software

Result transferSW-404-510-000
 Parameter set editorSW-404-520-000

Measuring Software

Interruption analysis (O.62)..... SW-404-530-000
 Event counters (O.95,O.61,O.71) .SW-404-540-000
 Group delay distortion (O.81).....SW-404-550-000
 Phase jitter and fr. error (O.91).....SW-404-560-000
 1500Hz filter/400Hz bandwidthSW-404-570-000
 ECHO.....SW-404-600-000

Others

Calibration Report CR-404-000-000E
 Car lighter power adapter EAA 10 367-000-000

ELEKTRONIKA reserves the right to change specifications without prior notice!

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